Comparative Cost of Production Analysis in East Africa: Implications for Competitiveness and Comparative Advantage.

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October 1996

Contents

Foreword

Over the past few decades, research and policy focus on agricultural productivity and competitiveness in sub-Saharan Africa has increased. This focus comes from developmental theory, which suggests that growth in the agricultural sector is critical in gener ating economic growth. This relationship is particularly important in Africa because of the often significant share agriculture has in total gross domestic product (GDP).

For farmers in Africa and elsewhere, net productivity is critically dependent on crop prices, level of output, and production costs. But yield variations due to exogenous factors such as weather, insects, and diseases can cause per u nit output costs to fluctuate considerably from one season to the next, eroding net profitability. Furthermore, input price subsidies for fertilizer s and agrochemicals often conceal actual costs of production and net profits, constraining efforts to measure true agricultural comparative advantage.

This study—*Comparative Cost of Production Analysis in East Africa*—is timely given the wave of economic reforms sweeping the region in recent years. It is an analytical attempt to highlight areas o f comparative advantage and disadvantage in various East African cou ntries and suggest ways in which these countries could improve regional and individual competitiveness in production and trade via optima l resource allocation. Its summary of findings on competitiveness of Kenya, Uganda, and Tanzania i n producing coffee, maize, beans, and cotton provides a means for each of these countries to rank an d prioritize their agricultural product ion enterprises on the basis of comparative advantage. It provides these countries a guide for making cho ices on which crops to emphasize. The study is also a useful contribution to the process of data set collection and dissemination in the area of agricultural comparative advantage and regional trade. It should be useful in guiding governments, donors, and the private sector in making important decisions that relate to these issues.

This report is one in a series of studies on Africa's regional trade and agricultural comparativ e advantage, a joint activity of the Africa Bureau's Food Security and Productivity Unit in the Office o f Sustainable Development, Productive Sector Gr owth and Environment Division (AFR/SD/PSGE), and the Regional Economic Development Services Office for East and Southern Africa (REDSO/ESA).

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Acknowledgments

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Executive Summary

The recent market liberalization in Kenya, Uganda, and Tanzania has improved farmers competitiveness in regional and world markets for coffee, maize, and beans. Kenya is the lowest cost producer of coffee and textiles, while Tanzania has a cost advantage in beans. Ugandan farme rs produce maize at the least cost per hectare but at the highest cost per kilogram in the region due to low yields. Kenya also has a comparative cost advantage in manu facturing cotton fabric but not cotton, and Tanzania and Uganda have a comparative advantage in the production of cotton, but not in cotton fabrics. These are findings of the Comparative Cost of Production in East Africa Study co nducted for USAID's Regional Office for East and Southern Africa (REDSO). The study examines maize, beans, coffee, potatoes, and textiles in Kenya , Tanzania, and Uganda.

The objective of the study was to gat her and analyze data on costs of production in agriculture and the textile manufacturing industry to determine whether or not each country has a comparative advantage in producing these commodities, and if they can competitively export them to regional and world markets. A ranking of each country's performance with respect to each commodity i s provided and recommendations as to how the least competitive countries can reduce their costs and improve their competitiveness ar e made. It is hoped that the results of this s tudy will assist African policymakers and donor agencies seeking to assist them in their approaches towards resource allocation and regional and international trade.

The approach of the study, given limited ti me and resources, was to rely on secondary sources of data. These were verified and supplemented where possibl e with primary data collected through interviews with key informants in each of the three countries. First, cost of production budgets were gathered for eac h country and commodity, and the cross-country comparative analysis undertaken. In the case of textiles , costs of production for at least one representative firm in each country were examined. These costs were compared to secondary data on cost of production and verified with interviews with textile firms in th e region.

Second, comparative advantage analyses were undertaken, using secondary data where possible. I n some cases, the COP and supplementary marketing and processing cost data was used to undertake a financial analysis of domestic resource costs (DRCs) to determine whether or not a country wa s competitive in world or regional markets.

COMPARATIVE COST OF PRODUCTION ANALYSIS

Total Costs

Findings from the comparative cost of production analysis are summarized in Table ES1. The thre e countries and four commodities are categorized according to relative costs of production per unit output, where 1=lowest cost producer, and 3=highest cost producer.

Table ES1. Ranking of Countries in Terms of Lowest Cost Producers (per kg): 1993

COMMODITY	KENYA	TANZANIA	UGANDA
Coffee	1	3	2
Maize	2	1	3
Beans	2	1	3
Textiles	1	3	2

Where: 1 = lowest cost producers
3 = highest cost producers

Kenya is the lowest cost producer of cof fee and textiles and Tanzania is the lowest cost producer of maize and beans when ranked on a cost per kilogram basis. Uganda produces maize at the lowest cost on a per hectare basis. In order to examine in more detail why this is so, total production costs were broken down into the major cost categories, and compared across countries and crops.

Labor Costs and Returns to Labor

Comparing labor costs per acre for any particular crop is difficult since the number of labor hours spent can vary considerably from year to year or from region to region. Averag e rural wage rates were compared, however, across Kenya, Tanzania, and Uganda, and were found to be quite similar. In the main coffe e growing regions, for example, wage rates were the equivalent of $19/month in Tanzania and Uganda, and $21/month in Kenya. For maize and beans, rural wage rates were again lowest in Tanzania at $16/month, and highest in Uganda at $18/month (Table ES2). In all three countries, family labor constitutes th e majority of total labor employed in crop production. The opportunity cost of family labor involved i n agricultural activities can be estimated using either the hired wage rate, or by examining returns to family labor in competing crops, which was also done.

Table ES2. Average Wage Rates in the Region: 1993

WAGE (per month)	KENYA	UGANDA	TANZANIA
Coffee	$21	$19	$19
Maize and Beans	$16	$18	$16
Textiles	$20 - $35	$35 - $75	$15 - $22

In terms of relative profitability a nd returns to labor, coffee fell substantially behind many other crops in all three countries. In Uganda, returns to nontraditional export crops such as chilies, vanilla, an d cardamom had returns twice as high as coffee. In Tanzania, returns to family labor devoted to coffe e production were negative in 1993, compared to around $3.00/day for maize. Kenya had the highest coffee returns at over $4/day under low input assumptions, and over $8/day under high input assumptions . Compared to rural wage rates of approximately $1/day, these returns are fairly high for smallholders. The

Kenyan lesson is that higher input use and better management results in higher yields and better quality coffee, and it does pay off.

Returns to labor for maize and beans were the highest in Kenya and lowest in Uganda. Small-scale Kenyan maize farmers earned $6.30/day in 1993, compared to $3.03/day in Tanzania, and negative returns in Uganda under one scenario, or $0.10/day under a second set of assumptions.

The implications of these findings for the agricultural sector are not that labor costs per se are a problem, but that productivity is. Better management results in higher yields, which in turn results in higher returns to the labor exerted on any particular crop. Low input use and productivity appear to be particularly important issues in Uganda and Tanzania.

The analysis of the manufacturing sector corroborates these conclusions. As would be expected, industrial sector wage rates as represented by those observed in the textile industry are higher than wage rates in the agricultural sector. Wage rates in Uganda for unskilled workers were highest in the region, although generally still competitive by global standards. Unfortunately, low wage rates in all three countries are offset by lower productivity particularly in Uganda and Tanzania as was found in the analysis of agricultural costs of production.

Chemical Input Prices and Costs

Chemical input prices, often thought to be a major limiting constraint to higher input use and better crop husbandry practices, also varied surprisingly little across the three countries. Input use, however, varies significantly over time and between regions as well as countries, making actual cost comparisons difficult (i.e. chemical input costs/ha.). One informative comparison is between coffee estate and smallholders' chemical input use levels in Kenya, where the large-scale farmers are spending up to 5 times as much on chemical inputs as smallholders and achieving yields up to 3.5 times as high (Crandall, 1993).

For maize and beans, one of the findings of the study was that yield-enhancing inputs such as fertilizers and other agrochemicals are simply not used on the majority of smallholder farms. Kenyan farmers spend on average $330/ha. on such inputs, compared to $146/ha. in Tanzania, and $99/ha. in Uganda. Informal farmer surveys suggest that low input use in Uganda can be attributed in part to the widespread belief that the soils in Uganda are naturally fertile and thus fertilizer is not needed. Input marketing and distribution systems are limited and inefficient in rural Uganda, and a concerted effort by the agricultural extension service to promote the use of yield-enhancing inputs is also lacking.

Chemical inputs, including fertilizers, insecticides and herbicides do not appear to be any more expensive in one particular country, but this is based on very limited data (see Table ES3). Comparing prices of chemical inputs in the industrial and agricultural sectors, therefore, did not prove very informative. In the industrial sector, although Uganda faced higher transport costs than Kenya and Tanzania, the market price did not vary considerably from the price in Kenya because taxes in Uganda were lower. In the agricultural sector, data collected for a few chemicals show few specific trends. In some cases the price is higher in Tanzania, in others it is higher in Kenya. Additional analysis is needed to determine definitively the reasons for price differentials in the three countries. Unfortunately, this study was unable in the limited time available to examine the breakdown of the cost of these inputs to determine if higher taxes or transportation costs are responsible for price differentials, for example. For the study period (1993), most of the input markets were fully liberalized in all three countries, with the exception of the fertilizer market in Tanzania which still reflected a 20 percent government subsidy and sales remained in the hands of a parastatal and a few cooperatives.

Table ES3: Selected Chemical Input Prices in East Africa: 1994/95*

INPUT	KENYA	UGANDA	TANZANIA
I. Agricultural Chemicals:			
1. Pesticides			
SUMMITHION (per liter)	$16.50	$9.43	not available
2. Fungicides			
DITHANE (per liter)	$10.10	$11.30	$15.45
3. Herbicides			
ROUNDUP (per liter)	$15.30	$12.90	$9.80
GRAMAXONE (per liter)	$9.43		$9.45
4. Fertilizers			
NPK (per kg)	$.45	$.40*	not available
II. Industrial Chemicals			
ACETIC ACID (per tonne)	$565.80	$591.00	$451.00
HYDROGEN PEROXIDE (per tonne)	$828.00	$800.00	$906.00

Exchange rates used: Kenya — $1=44 KShs; Uganda — $1=930 Ushs; Tanzania — $1=550 Tshs

*   urban retail prices

Cost and Availability of Seed

The cost of maize seed was highest in Uganda at $.97/kg, followed by Tanzania at $.89/kg, and cheapest in Kenya at $.81/kg. More important than the cost of seed, however, are availability issues in all thre e countries. Kenyan smallholders, and their counterp arts in Uganda and Tanzania have experienced repeated problems with obtaining good quality seed. Currently, the majority of Ugandan farmers use local (low - yielding) varieties of maize seed. Availability of good quality seed potatoes and coffee seedlings were also constraints faced by farmers in all three countries. The majority of farmers in all three countries rel y heavily on their own bean seed as certified commercial seed is largely unavailable.

Marketing Costs

The analysis of agricultural marketing costs revea led that coffee processing costs were significantly higher in Kenya than in Uganda, al though they have declined in the last 2 years with liberalization and increased competition in coffee milling. The costs o f maintaining inefficient cooperatives are hurting coffee farmers in all three countries. Kenya's sm allholder coffee marketing costs vary considerably from one cooperative to another, for example, leaving much room for improvement. Improvements in labor management b y cooperatives, increasing capacity utilization through selected factory closures, and the removal of th e

Coffee Board of Kenya's monopoly in auctioning coffee would increase coffee payments to cooperative members from 57 percent to 77 percent of free on board (FOB) prices, according to the estimates of one analyst (Nyoro, 1994).

Although no detailed analysis of transport costs was undertaken [1], the analysis in the manufacturing sector revealed that in some areas there were significant cost differentials that would also affect marketing costs in agriculture. Telecommunications costs were found to be significantly higher in Tanzania than in Uganda or Kenya. Fuel costs were found to be higher in Uganda even after factoring out the higher transportation costs. Utility costs were also found to be high in all three countries, particularly in Uganda and Tanzania (Table ES4). Shortages of water and electricity in Tanzania have been particularly debilitating to industry.

Table ES4: Utility Costs in the Region: 1993

UTILITY	KENYA	UGANDA	TANZANIA
Electricity/Kwh	$0.035	$0.075	$0.073
Water/m3	$0.56	$0.0014	$0.104
Industrial Fuel/Liter*	$0.373	$0.489	$0.353
Telecommunication* Costs per Minute (to the USA)	$3.36	$4.3	$6.63

Sources: The Kenya Export Competitiveness Study, 1994; Fuel Marketing Companies in the region, telephone companies in the region

* 1994 data

Comparative Advantage and Competitiveness

The cost of production analyses were taken a step further to examine the comparative advantage and competitiveness of the three countries in the production and trade of the commodities studied. Table ES5 summarizes these findings. A numbering system was used to indicate the degree of competitiveness, where a 3 indicates strong competitiveness given current policies and market prospects, a 2 signifies weak competitiveness and room for improvement in policies and reducing costs of production and marketing, and a 1 indicates a situation where current and future competitiveness will depend on significant changes in domestic policies and institutions and/or in reducing costs of production and marketing. The most critical constraints limiting competitiveness are indicated with an x.

The results of the analysis show that all three East African countries have a comparative advantage of coffee and textiles (especially in low skill labor-intensive garments) provided improvements are made in marketing efficiency. As for maize and beans, the situation is much different, with only Tanzania having an overall comparative advantage both in regional and world markets. Kenya has no comparative advantage in maize either at the regional or world market levels. However, Kenya was found to have a comparative advantage in beans in both markets (with the exception of the Ugandan market). The dilemma facing

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[1] A regional comparative cost of transportation study was being undertaken for USAID by Technoserve at the time of this study.

Kenya is that local demand for beans still outstrips domestic production, making the export marke t unattractive (which does not mean that at any given time it is unattractive to individual traders, however).

The agricultural subsector analyses reveal that the recent market liberalization in these sectors ar e beginning to have positive impacts on farmers incentives and crop output. Inputs are becoming mor e available, although in Tanzania the State and inefficient cooperatives still dominate the marketing an d distribution of such essential inputs as fertilizers. Price controls in both input and product markets are a thing of the past in all three countries, except for the coffee market in Kenya which is still monopolized by KPCU and has not yet been opened up for private trader's participation.

The textile industry, which this s tudy found to be competitive, also has untapped potential that has not been fully exploited. It was observed that some textile factories were closing down in Kenya and Uganda in spite of the finding that the three countries have a comparative advantage in the industry. Plausibl e explanations for problems facing these firms include the following:

- Compared to the textile industries in competing countries such as the South East Asian countries, East African textile industries are inefficient in their producti on (especially in Uganda and Tanzania). These inefficiencies that raise costs are largely due to:

  - the use of outdated technology

  - inefficient management, especially in the case of parastatals

  - low labor productivity

- The dumping of textiles and garments (both new and used) in the local market.

- Poor quality and high cost inputs, which in most cases are imported.

RECOMMENDATIONS

There are a number of recommendations arising from the analyses of specific commodities that ar e applicable to all three countries. They have been categorized into the following constraint areas, in order of priority as identified in our analysis:

Low agricultural chemical input use

There is a need for a study on chemical input use in the region to determine if the cost of inputs is really a constraint and if input subsidies (properly targeted) are still needed. Liberalization of input market s should be making inputs more readily available to farmers, albeit at a higher price as subsidies ar e removed. One of the theories for why farmers have used such low input levels in the region is that the y simply have not been available, since governments have had limited fund s available to finance the subsidies and thus have been able to make insufficient amounts of fertilizer available (and it is usually the well-off farmers who are able to secure rationed supplies). Getting the government out of the market is therefore supposed to increase fertilizer use. If this is true, we should be seeing higher input use by smallholders in Kenya and Uganda (Tanzania still needs to liberalize fertilizer distri bution). Since liberalization is so recent in the region, a study to determine if this is indeed happening would be extremely useful at this time.

Table ES5. Summary of Competitiveness Findings

KEY RESTRAINTS TO COMPETITIVENESS	KENYA				UGANDA				TANZANIA			
	Coffee	Maize	Beans	Textiles	Coffee	Maize	Beans	Textiles	Coffee	Maize	Beans	Textiles
Competitiveness Indicator (World)	2-3	1	3	2	2-3	1	1	1	2	2	2	1
Competitiveness Indicator (Regional)	—	1	2	3	—	1-2	1	2	—	2	2	1
Production Costs		■	■	■		■	■	■				■
Marketing Costs	■	■	■	■	■	■	■	■	■	■		■
Productivity	■		■	■	■	■	■	■	■		■	■
Labor Costs						■	■					
Chemical Input Costs		■								■	■	
Other Input Costs			■					■				■
Policy			■			■	■	■				■
Infrastructure			■		■	■	■		■	■		■

Where: 3 =Strong competitiveness given current policies and market prospect

2 =Weak competitiveness; some policy/institutional changes still needed

1 =Competitiveness in future will depend on major changes in domestic policies and/or in reducing COP.

Lack of availability of high quality seed

For maize, a thorough examination of seed producti on, multiplication, certification, and marketing system, and implementation of reforms in this area, is needed in each of the countries. The problem of see d production should thus be tackled as a regional issue, and the donors could play an important role i n encouraging regional collaborative research in maize breeding and production of new hybrids for th e various agroecological zone s in the three countries. Presently Kenya has developed many hybrid varieties which could be bulked in adequate quantities for commercial distribution to Uganda and Tanzania. Private seed companies should be licensed and encouraged to work on seed production for the East African region. In Zimbabwe for example, an American owned seed company has just started seed production on a large scale for the southern African region. The fea sibility of a similar project should be looked into for the East African region. Seed quality and availability is also a problem in the beans and potato subsectors.

Need for increasing availability and adoption of new technologies/increased emphasis and support to research and extension

Developing disease resistant and higher yielding coffee varieties would have a high payoff for coffe e producers in the region. Better seed potatoes also need to be made available to farmers. There are many

smallholders in Uganda and Tanzania who still have limited or no access to high-yielding varieties of maize and beans. There is also a need for improved research on cotton varieties to ensure that the strains that are grown are suitable for the agroeconomic zones in the region. The problem is not so much a lack o f applicable research as limite d resources spread too thinly at the national research centers. Similarly, there are limited linkages between research and extension services in each of these countries that would ensure the research was demand-driven.

One possible approach donors could take in regionalizing research in East Africa would be th e establishment of a foundation with the objective of overseeing research efforts in the major crops in the region. If it had a board of directors made up of the directors of the national research centers and th e International Agricultural Research Centers, an important linkage could be established. The mandate of such a foundation would be to coordinate regional research plans between the national research centers and the international centers and to strengthen linkages between research and extension services. It woul d require a small secretariat and core group of technical people involved in strategic planning, looking a t priority commodities and constraints, and who can make objective assessments of institutional capabilities. They could hire or second social and biological scientists from each of the countries as needed.

This type of approach would be most effective if it were a multi-donor effort, and could be developed under the Special Program for Agricultural Research (SPAR), established by the World Bank. There i s some experience with such research foundations in Latin America, thus the first step should perhaps be a closer look at the experience and lessons from those institutions.

Low labor productivity

There is a need to focus attention on improving productivity of labor both on the farm and in industry in general. In agriculture this can be done by i mproving incentives for smallholders so they can achieve yield levels found on large farms. Continued pressure by donors towards full implementation of agricultura l market liberalization efforts needs to be applied. Effective national extension services are also needed to encourage farmers to move from low input technolog y subsistence-level farming to commercial high input production systems.

In industry there is a need, particularly in Tanz ania and Uganda, but also in Kenya, to upgrade training facilities for both semi-skilled and skilled labor. Backwar d linkages between large industry and small-scale enterprises also needs to be fostered. One method of promoting these linkages is through donor support to associations such as the Agribusiness Association in Kenya, a fledgling organization with both large and small-scale agribusinesses as members. Another is in efforts to get the private sector more involved i n private sector developmen t through workshops, round tables, etc. which get the private and public sectors as well as NGOs and lending institutions discussing ways of overcoming constraints to private secto r growth. In line with this, a detailed review of ways to enhance productivity in the region could b e undertaken and used as a discussion piece in a forum consisting of key private sector, government an d donors in the region.

High marketing costs

Marketing costs in general are too high in the region. Targeted attempts need to be made at improvin g infrastructure in the region. For example, investments in rural marketing infrastructure and the expansion of current market information systems to include coverage of regional cereals markets would lowe r marketing costs for smallholder producers of all crops . Fuel costs in Uganda and telecommunications costs in Tanzania are too high. Utility costs in general are too high in the region and frequent shortages of water and electricity need to be addressed. This is a definite area for continued donor pressure toward s privatization, or at least commercialization through the introduction of more competition, or the hiring of

outside (nonpolitical) management, for example. In addition, analysis of fuel costs in the region specifically aimed at identifying efficiency enhancing measures should be undertaken. It should cover all aspects of the distribution chain including refining, marketing costs, administrative overhead costs, and taxes.

The comparative cost of production analysis of coffee showed there is continued work to be done in all three countries towards increasing processing and marketing efficiency at the cooperative level. This can be done by promoting competition among traders and millers (i.e. making sure market liberalization steps are fully implemented). Given the similarity of the research needs of the coffee industry in Kenya, Tanzania, and Uganda, it may make sense to consider funding a regional coffee research center. This would avoid duplicative efforts and may be possible given the current policy environment and discussions of reviving the East African Community.

Glossary of Acronyms and Abbreviations

ADC   Agricultural Development Corporation
AFR   Bureau for Africa (USAID)

CIF   Cost Insurance Freight
CIP   Chemical Input Costs
CMB   Cotton Marketing Board
COP   Cost of Production
CSRP   Cereals Sector Reform Program

DRC   Domestic Resource Costs

EAC   East African Community
EEC   European Economic Community
EPADU   Export Policy Analysis and Development Unit
EPR   Effective Protection Rate
EPZ   Export Processing Zone

FAO   Food and Agriculture Organization of the United Nations
FOB   Free On Board

GDP   Gross Domestic Product
GM   Gross Margin
GOK   Government of Kenya

HIT   High Input Technology

KPCU   Kenya Planters' Cooperative Union

LIT   Low Input Technology

MIT   Medium Input Technology
MUB   Manufacturing Under Bond

NIC   Newly Industrialized Community
NTE   Non Traditional Export
NTM   Nyanza Textile Mill

PAM   Policy Analysis Matrix
PSGE   Productive Sector Growth and Environment Division (USAID/AFR/SD)
PTA   Preferential Trade Area

REDSO   Regional Office for East and Southern Africa

SAPs   Structural Adjustment Programs
SD   Office of Sustainable Development (USAID/AFR)
SOW   Statement of Work
SPAR   Special Program for Agricultural Research

TCMB   Tanzania Cotton Marketing Board
TOR   Terms of Reference
TPDC   Tanzania Petroleum Development Corporation

USAID   United States Agency for International Development

VAT   Value Added Tax

WFP   World Food Program

1. Introduction

BACKGROUND

This report presents the findings of a study conducted during the period August to November of 1994 , analyzing the comparative costs of production for coffee, maize, beans, potatoes, and textiles in Eas t Africa. Originally the study was expected to cover the five Eastern African countries of Kenya, Uganda, Tanzania, Rwanda and Burundi. However, due to the security problems in Rwanda and Burundi, it wa s decided to limit the study coverage to the former three East African Community states of Kenya, Uganda and Tanzania. The study was commissioned by Technoserve Group on behalf of the USAID Regiona l Office for East and Southern Africa (REDSO).

As a contribution to the economic development and food security in the Eastern African region , REDSO has proposed and sponsored a number of studies in the region focusing on the problems facin g agricultural and industrial production, marketing and trade in individ ual member countries and in the region as a whole. The Comparative Costs of Production Analysis is one such study, with the purpose o f highlighting areas of comparative advantage and disadvantage of the respective countries in the region and to suggest ways in which these countries could improve regional and individual competitiveness i n production and trade. Hopefully, the study will also assist the governments in this region to individually, bilaterally or collectively focus on policies which will enhance trade in the region and lead to an optimal allocation of each country's resources in areas where they have a comparative advantage.

The timing of the study is appropriate. Countries in the region are undertaking bold policy changes , such as structural adjustment programs (SAPs), inv olving internal and external trade liberalization. Kenya, Uganda, and Tanzania have alread y relaxed several crossborder trade restrictions and have even proposed working on the modalities of reviving the defunct East African Community as a step toward mor e liberalized trade and regional economic integration. It is also worth noting that with the establishment of the Preferential Trade Area (PTA) covering Eastern and southern Africa, there is a need for each of the countries to identify its areas of comparative advantage as a basis for carrying out trade within the region.

OBJECTIVES OF THE STUDY

From the statement of work (SOW) and terms of referenc e (TOR) of the study (see Appendix 1), and from preliminary discussions held with the USAID/REDSO office, the objectives of the study can b e summarized as follow:

- Gather and analyze data on costs of production for maize, beans, po tatoes, coffee and textiles in Kenya, Uganda and Tanzania.

- Undertake a comparative cost of production analysis acros s the three countries (converting all the costs to US$ equivalent), focusing on:
  - comparative costs of labor, rents, utilities, key inputs, capital items and other variable costs.
  - comparative costs associated with the regulatory environment including taxes, subsidies, etc.

- comparative costs of services including transport, insurance, energy (electrical and petroleu m inputs) and banking, in the production process of textiles.

- Rank the three countries by subsector according to their competitiveness in cost of production.

- Provide discussions as to where and when a given country has a specific advantage over others in the region with respect to production costs.

- Provide recommendations on how the least competitive countries could improve their costs.

REPORT OUTLINE

Chapter 2 describes the methodolo gy used in the study. Chapters 3, 4, 5, 6, and 7 present the results of the comparative cost of production anal ysis for coffee, maize, beans, potatoes, and textiles. Chapter 8 focuses on issues of comparative advantage and competitiveness of maize, beans, coffee, and textiles. Th e executive summary of this report provides a comprehensive summary of the findings of the study and our recommendations.

Appendix 1 contains the Scope of Work. Appendix 2 contains more detailed country-specific coffee COP analysis for Kenya, Uganda, and Tanzania. Similarly, Appendix 3 focuses on maize, Appendix 4 on beans, Appendix 5 on textiles. Appendix 6 contains detaile d comparative advantage analyses for maize and beans, and Appendix 7 gives a background description of the textile industries in Kenya, Uganda, an d Tanzania.

2. Methodology and Study Approach

INTRODUCTION

The study was carried out by two agricultural economists and one economist between August an d November of 1994. A critical review of the SOW provided by the client and the expected tasks that had to be carried out during the study indicated that the study was wide in scope in terms of geographical and subsector coverage. At the same time, there were detailed and intensive data requirements and analyses of cost of production data for each of the subsectors in each of the three countries within a limited tim e frame of only three months.

In light of all these requirements, a data gathering and analysis plan had to be formulated t o accommodate both the wide scope of coverage and the limited time and resources available. Th e methodology selected had to answer the following questions:

- What are the inputs used in the production process of the commodities under study in each of th e countries?

- Are there any differences in production technologies within and among the countries in the region for the selected commodities, i.e. maize, beans, potatoes, coffee, and textiles?

- If there are differences in production technologies, what are these differences and how are the y reflected in the cost structures?

- What are the direct and indirect cost elements in each of the selected subsectors in each country, and what are the itemized and aggregate cost levels in each case?

- What are the inter-country prod uction cost differences in each of the subsectors in terms of cost items and cost levels?

- What factors are responsible for the inter-country cost differences across similar subsectors?

METHODOLOGY FOR THE AGRICULTURAL SECTOR

In order to analyze the cost of production for maize, beans, potatoes, and coffee, a two-step approach was taken. First, secondary data on farm level production costs and marketing costs were gathered for each of the 3 countries. Second, this C OP data (in some cases very detailed, in others very vague) was interpreted and analyzed, and the cross-country comparisons made.

Data Requirements for the Agricultural Subsectors

In the agricultural subsectors, the data requirements for cost producti on analysis for each crop included data and information on:

- Yield (kg/ha) levels at selected representative levels o f technologies and where relevant (and possible), at the small, medium, and large scales of operation.

- Level of technology as reflected in the standard of crop husbandry practices. For convenience where possible, the level of technology has been defined as follows:
  - Level I: Low input technology (LIT)
  - Level II: Medium input technology (MIT)
  - Level III: High input technology (HIT)

- Quantities of variable material inputs and the associated variable costs of production. These include:
  - seed input and its procurement cost which include the purchase price, transportation and storage;
  - fertilizer input and its procurement costs;
  - pesticides and other agrochemical inputs like herbicides, fungicides and insecticides and their procurement costs; and
  - other inputs that may be identified as variable.

- Quantities of labor inputs and the associated costs of production they entail. Labor inputs include both hired (casual or permanent) and family labor used to carry out such operations like land preparation, planting, weed control, chemical application, crop maintenance and harvesting.

- The fixed cost elements involved in the production process of each of the commodities were also identified and costed. These include such costs as:
  - depreciation and interest costs on equipment;
  - management fees and staff salaries where applicable;
  - infrastructure and farm structure depreciation and overhead costs;
  - cost of utilities on the farm, appropriately apportioned to the enterprises concerned; and
  - in the case of coffee, a perennial crop, the annualized establishment costs.

- Local and world market prices of the various inputs used in the production of the various commodities covered in the study.

- Prices of each of the commodities in the local, regional, and world market.

- Transportation and marketing costs in both the input and the product markets.

CHALLENGES OF COMPARING AGRICULTURAL COSTS OF PRODUCTION ACROSS COUNTRIES

A farmer's profits from growing a given crop depend upon the price he receives for his output, the level of output he is able to produce, and the costs he incurs in producing it. One way of judging competitiveness is to compare those production costs across countries. However, caution must be used in these comparisons. Few national agencies collect farm account-based cost data. Often, Ministry of Agriculture cost estimates are based on recommended practices rather than empirical work conducted by researchers.

Methods for measuring cost of production vary considerably across both countries and commodities. In some countries, they are reported in terms of specific input categories. In others, costs are reported in terms of a mix of inputs and activities, where the latter might be described as land preparation or harvesting

using a combination of inputs. Typically, costs of production are calculated on a per hectare basis. They are then converted to a per unit of output basis by dividing per hectare costs by yield. Yield variations due to weather, insects, and diseases can cause costs per unit of output to vary considerably from one crop season to the next. Very good yields reduce per unit output costs and poor yields increase them. It is important, therefore, to have some notion of "normal" yields in judging the representativeness of production costs per unit of output in any particular growing season. Given the variability of yields, production costs are likely to vary significantly across seasons.

Costs also vary among farms and over time as a result of different intensities of input use, effectiveness in use of inputs, changes in prices of inputs, and cultural and management practices. Variation in input prices affects profits to the extent that these fluctuations are not fully offset by compensating changes in output prices. In practice, production cost data do not always indicate separately the price and quantity of each input, which makes comparisons impossible.

It is common in many developing countries to subsidize the prices of some inputs, especially fertilizers and agrochemicals. Sometimes the subsidies are reflected in the market price of these inputs. In cases where parastatals control the marketing and processing of crops, the cost of inputs is deducted from the prices paid to producers. Structural adjustment programs in most countries include major reductions in input subsidies. Thus, large differences in input prices occur as subsidies are reduced. For purposes of examining international competitiveness, it is often desirable to adjust production costs for these subsidies and add them to variable costs. However, due to the on-going structural adjustment programs and trade liberalization in East Africa, such policy distortions have been assumed to be minimal and will not be a major focus of this study.

In most cases, variable cash costs are the only available information, since fixed costs have not been allocated to each commodity. In general, data on depreciation and imputed capital, land, and labor costs are also not available. This is not a serious problem, however. These costs do not affect short-run production decisions or allocation of resources among commodities, since they are return measures for the whole farm and affect long-term profitability.

METHODOLOGY FOR THE TEXTILE SUBSECTOR

In order to analyze the cost of production for the textile industry a three step approach was used. First, detailed cost data was obtained from one representative firm in each country. This data was then analyzed and compared across the three countries to identify differences in costs of production. Once the cost data had been analyzed it was used to identify areas of comparative advantage for the three countries, Kenya, Uganda and Tanzania. In order to complement the data collected a detailed review of all the secondary data available was carried out. In addition, a number of firms in the region were interviewed to cross check the data collected and verify inferences and conclusions made in the report.

Data Requirements for the Textile Subsector

The data requirements to measure costs of production in textile manufacturing are quite extensive. The requirements included:

- Direct costs, which include cost of raw materials, labor, fuel, water, electricity, packaging, and telecommunications;

- Manpower overhead costs such as salaries and fringe benefits for the general manager, directors, engineering, and other technical staff;

- Non-manpower overhead such as land rental, depreciation on ma chinery, equipment, infrastructure and building, insurance, legal expenses, accounting expenses, travel and other utility expenses.

Challenges of Comparing Industrial Costs of Production across Countries

Similar to the agricultural subsector, it is very difficult to compare industrial costs of production acros s countries. One of the most difficult challenges is that the textile industry has such a large variety o f products with varying production methods and technol ogies. Comparison therefore has to be across similar products. In this case, it was decided to use a unit of analysis, woven cotton fabric, since it is a base for a variety of different products.

Costs also vary depending on the size of the firm and the level of input use. It is very difficult t o determine exact levels of input use as the data often available from firms is aggregated. In the same vein, it is very difficult to allocate non-manpower overhead costs such as land rental, depreciation to specific products as the data is often not aggregated in this way. The data available also does not give an indication on the kinds of technology used and hence the productivity of the firm at all stages of production fro m spinning to weaving to dyeing and bleaching is difficult to determine and compare.

In addition to all these challenges it should be kept in mind that firms in the region are very sensitive about giving out detailed cost information for fear of com petitors or tax implications. As a result, obtaining detailed reliable data from a good sample of firms is a ver y difficult exercise. Very often interpretation and estimates need to be made on some costs that are aggregated or not available using secondary data o r general discussions with experts in the field.

3. Comparative Coffee Cost of Production Analysis

Kenya, Tanzania, and Uganda

SMALLHOLDER COFFEE PRODUCTION

This study will focus on smallholder coffee production, since the comparative cost of productio n information available for all three countries is for that sector. Estate coffee production is large-scale and thus represents a very different cropping system from that of a smallholder farm. Nonetheless, the hig h degree of coffee management found on Kenyan estates, for example, provides useful insights, and these comparative practices will be considered below as well.

Before looking at costs, what are the farm-level activities that are involved in producing coffee? They include change of cycle, pruning, handling and desuckering, hand and chemical weeding, fertilize r application, spraying, manuring, mulching, and picking. There are significant differences in the level and frequency of these activities, both across regions and different farm sizes.

One advantage the more labo r-intensive, smaller operations have over large-scale mechanized estates is that they produce higher quality coffee. Quality is influenced by management practices at each stage of production and processing, including use of appropriate and adequate fertilizers, prevention of coffee berry disease and leaf rust through fungicide spraying, picking of the cherry when it is ripe, not allowing th e cherry to ferment during the soaking and washing processing stages, and sun-drying the parchmen t (Crandall, June 1993). The quality of the coffee bean is determined after processing, roasting and liquoring, and a class 1 bean (the highest quality) commands a price up to 50 percent higher than the price received for average quality coffee (class 5-6) [2].

Although the final farm-level output of smallholders is cherry coffee, pos t-harvest handling, processing, and marketing costs have to be included in any analysis of returns to farmers, since these costs ar e determined and deducted from the final price the farmer receives in all three countries.

Smallholders typically deliver their cherry coffee to factories owned by their cooperative societie s where the cherry is pulped and dried into parchment coffee. The parchment is then transported from the cooperative factory to a large milling facility for grading, sorting, milling (hulling), and storage. Such mills are usually parastatal or cooperative union owned and situated in the capital cities. After the coffee ha s been milled by the large coffee mill, it is sold through an auction process. It is only after the coffee ha s

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[2] The higher quality achieved by smallholders can be seen in Kenya, where in 90/91, 4 percent of estate coffee was between classes 1 and 3 (and 80 percent between 4 and 6), and smallholders had 17 percent between classes 1 and 3 (and 58 percent between 4 and 6).

been sold that the farmers receive their payments, usually in the form of a partial initial payment to b e followed by a final payment [3].

COMPARATIVE COST OF PRODUCTION FOR COFFEE: KENYA, UGANDA, AND TANZANIA

The best information on coffee COP came from Kenya due to the existence of the PAM research team, who collect farm-level cost of production information several times a year for many crops across several regions. Recent World Bank-funded studies on comparative advantage of export crops were available for Uganda and Tanzania. Although not as detailed (particularly in the input level assumptions behind them), they include COP data for Arabica coffee production in 1992/93 i n similar agroclimatic zones as the Kenya data, allowing a valid cross-country comparison. Comparable COP budgets for 1992/93 have bee n converted to U.S. dollars (with the exchange rate assumptions given at the bottom of the table) and ar e presented in Table 3.1. Detailed country-specific coffee COP analyses are presented in Appendix 2.

Costs per hectare are very similar for all 3 countries, at approxima tely $500 per hectare, although under the higher input scenario for Kenya, total costs are $1297/ha. Costs of production for low input Kenya n coffee farmers have not increas ed substantially since 1981/82, when they ranged from $621 - $853/ha., or $1.20 - $1.60/kg. (Kristjanson et al, 1990). At h igher input/management levels at a cost of $1297/ha., costs have virtually doubled since 1981/82 in Kenya. In Tanzania, the costs of producing Arabica ranged from $55/ha. to $95/ha. in 1989 but have since increased to over $500/ha. during the period 1989-1993 (which corresponds to the period of liberalization discussed below).

Translating per hectare costs into per kilogram clean coffee costs requires using some kind of average yield figures. A comparison of coffee yields using secondary data is complicated by the fact that som e sources use yields of clean coffee while others use parchment or cherry yields. In Tanzania and Uganda, for example, yields of parchment coffee — that is, coffee that has been washed, pulped, and dried — are used since most farmers hand-pulp on their farms. In Kenya, farmers typically deliver the coffee cherry to their cooperatives wh ere these processes are carried out. The yield of the final product, clean coffee, is determined after the par chment coffee has been milled (i.e. hulled). Thus clean coffee yields are partially determined by the efficienc y of the farmer's, cooperative's, and miller's processing steps, although overall it is the husbandry practices followed by the farmer that largely determines the ultimate yield of clea n coffee.[4] Table 3.2 shows the sources and yields used in the comparative analysis.

The cost of producing one kilogram of clean coffee was lowest in Kenya, at $.80/kg. under a low input assumption, and $1.08/kg. under a higher input scenario (see Table A2.2 for details on these inpu t assumptions). It should be noted that the yields used in the case of Kenya are actual yields achieved b y farmers as reflected in PAM's crop budgets. In the case of Tanzania and Uganda, average national yield figures are used, which m ay or may not reflect an actual "average" farmer's yields. The cost of producing one kilogram of clean coffee was $1.09 in Uganda in the 1992/93 crop year, and $2.23/kilogram i n

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[3]   In Kenya, Tanzania, and Uganda, a pooled payment system was used which averaged prices over the year. The aim was to minimize the effects of sharp price changes on farmers, but it also delayed payments and gave farmers less incentive to produce high quality coffee. This has changed recently in Tanzania and Uganda, where farmers may now sell to private traders, and in Kenya, where an "out-of-pool" system was introduced in 1992. Kenyan coffee farmers can now choose to receive proceeds immediately after coffee sales, thereby improving incentives to produce higher quality coffee.

[4]   Out-turns of clean coffee from ripe cherry should average around 15 to 20 percent.

Tanzania. Tanzania's high per kilo cost of production, even though per hectare costs are in line wit h Kenya's and Uganda's, are a reflection of the extremely poor yields being achieved [5].

Table 3.1 Summary of Comparative COP Budgets for Arabica Coffee — 1992/93: Kenya, Uganda and Tanzania ($/ha & $/kg clean coffee)

INPUT	UGANDA	KENYA		TANZANIA
	Low Input	Low Input	Avg. Input	Low Input
VARIABLE				
Fertilizer	96	14	215	37
Insecticides/Fungicides	46	15	596	86
Herbicides	46	0	6	0
Manure/Mulch	0	61	63	42
Transport	8	13	0	4
Depreciation/Capital Costs	37	7	19	8
FIXED COSTS (ANNUALIZED)	73	137	143	78
LABOR COSTS	184	232	255	217
TOTAL COST ($/Ha)	490	478	1297	472
AVERAGE YIELD CLEAN COFFEE (KG/HA)	450	595	1200	211
COST PER KG CLEAN COFFEE ($/KG)	1.09	.80	1.08	2.23

Exchange rate assumptions (Oct.-Sept., 1992/93 average): Uganda — UShs/$US: 1036; Kenya — KShs/$US: 50; Tanzania TShs/$US: 450

Kenya yields are actual yields from crop budgets; yields for Uganda and Tanzania are national average yield figures (see Table 3.2).

Sources: Kenya — PAM budgets; Uganda — Bank of Uganda, 1993; Tanzania — World Bank, 1992.

Comparison of Yields, Returns & Profitability

In 1993, Uganda had 28,700 hectares planted in smallholder Arabica, Kenya had 124,000, and Tanzania had 190,842. While comparisons o f yields are extremely difficult to make as they vary so much over time and by region, along with the difficulties using secondary data mention ed above, in general Kenyan farmers have been achieving the highest yields and Tanzanian smallholders the lowest (Table 3.2). This appears to be due to higher input use.

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[5]   The Tanzania cost per kilo of clean coffee may be overstated, particularly for some small-scale farmers, due to the assumptions of: very low yields (from national average figures), and 2) relatively high input use (from recommended input packages). More actual farm budget data is needed.

Table 3.2 Comparison of Smallholder Yields of Arabica Coffee: 1992/93

Country	Average Yield, Clean Coffee, kgs/ha
Kenya	400 - 750
Uganda	450
Tanzania	211

Kenya — Central & Eastern Provinces average yields (Source: Crandall, 1993)

Uganda — National average yield (Source: World Bank, 1992)

Tanzania — National average yield (Source: Min. of Agriculture/MDB, Industry Review of Agriculture, 1993).

The production of coffee in Kenya was also more profitable in 1992/93 than in Uganda and Tanzania (Table 3.3). Most Tanzanian coffee farmer s actually lost money during that crop season. Better husbandry and higher input use paid off for Kenyan farmers using improved man agement techniques, who made twice as much money as their counterparts who used very low levels of ch emical inputs. In order to examine why this was so, a closer comparison of the various cost components is taken below.

Table 3.3 Comparison of Profitability (Revenues - Costs) of Arabica Coffee ($/ha)

Country	1991/92		1992/93	
	Low Management	Improved Management	Low Management	Improved Management
Kenya	-45	198	990	2160
Tanzania			-640	
Uganda			190	513

Uganda yield assumption: 650 kg/ha parchment; Kenya low management yield   assumption: 2,975 kg/ha cherry (around 595 kg/ha clean coffee), Improved management yield: 6,000 kg cherry/ha. (1200 kg/h a clean coffee); Tanzania yield assumption: 750 kg/ha parchment.

Kenya low management assumptions: 1.5 kgs/acre Green Copper + .5 l/acre Fenitrothion; Improved management assumption: 1 liter/acre insecticide Summith ion; .5 l/acre herbicide Gramoxone; 150 kgs/acre fertilizer CAN and 124 kgs/acre 20:20:10.

Comparative Processing Costs

Uganda's high processing costs (see Table 3.4) are surprising, give n that they deal mainly in Robusta coffee which has less processing than does Arabica. However, these high costs have been attributed t o overinvestment in hulling capacity and the fact that, prior to 1991, the Government established processing and marketing margins which had grow n to very high levels by 1990. It is no wonder that the World Bank *Agriculture Sector Review* of 1993 concluded that Uganda can significantly increase its competitiveness by improving the efficiency of its pro cessing industry, and lowering transport and marketing related costs.

Table 3.4 Comparison of Coffee Processing Costs (1990 prices)

Country, Type of Coffee	Cost of Milling, Grading, Bagging	Cost of Processing and Marketing
Kenya, Arabica	$41/ton	$176/ton
Costa Rica, higher valued Arabica	$66/ton	$300/ton
Uganda, Robusta	$126/ton	$448/ton*

Source: World Bank Agriculture Sector Review*, 1993.*

* of which only $77 represents transport costs to the Coast.

The cost of processing Arabica in Uganda was estimated at UShs 201/kg in 1993 (approximatel y $200/ton). The producer pric e at this time was UShs 700/kg clean coffee, implying processing costs of 28 percent of the farm price. A recent study concluded that prior to liberalization in 1991/92, the export tax and intermediary margins took away 70 to 80 percent of the realized world price. After the removal o f taxes, liberalization of foreign exchange, and improvements in processing and marketing efficiency as a result of liberalization and increased competition, coffee farmers now receive around 70 percent of th e world market price (Bank of Uganda, 1994).

Kenya's smallholder processing costs vary considerably from one cooperative to another. A n examination of these costs for 10 cooperative factories showed that they ranged from around $180 t o $340/ton clean coffee, compared to an estate factory c ost of $152/ton. If efficiency can be measured by the percentage of gross cherry price received by farmers, which ranged from 5 9 percent for inefficient factories to 78 percent for well-managed ones, then the majority of factories could be judged as inefficient. High cooperative costs are largely attributed to:

- High labor costs (KShs 6,000/ton for some cooperatives versus KShs 1,000/ton clean coffee for estate factories). Most of the cooperative s tend to over-employ, as many managers gauge their popularity by the number of persons employed.

- Mismanagement, since many of the cooperative manage rs have little or no management skills. In most cases, committee members are elected on the basis of political patronage.

- Lack of incentives for managers to increase payments to farmers since Society Committee members do not draw a salary bu t are instead paid an allowance based on the number of meetings held (Nyoro, 1994).

According to Nyoro (1993), if thre e improvements were to be made toward increasing processing and marketing efficiency — improvements in labor management by coop eratives, increased capacity utilization through closing some factories, and removal of the monopoly of CBK in auctioning coffee — coffe e payments to farmers as a proportion of FOB prices would increase from 57 percent in cooperatives to 77 percent, and from 71 percent to 82 percent in estates.

Comparative Chemical Input Costs

Data on average input use for Uganda was not available, but budgets from th e cited secondary sources show UShs 48,000 - 196,000/h a spent on all chemical inputs for traditional and improved Arabica, respectively ($51/ha - $208/ha, or $23-$92/acre).

In Kenya, the average amount spent per acre on chemical inputs ranged from $4.40 to $14.87 i n 1991/92 across 4 districts, b ut was quite a bit higher for the 1992/93 "average input" budget, at $363/acre. As a comparison, it should be noted that in the 1992/93 low input scenario, farmers only spent $13/acre. Tanzanian coffee farmers appear to pay less than Kenyan or Ugandan farmers for pesticides and fungicides, but this was in 1992 when some input subsidies may have still been in effect. In Kenya, farmers ar e applying on average 1.5 kgs/ha pesticides, whereas the Tanzanian crop budgets show higher application rates of 7.5 l/ha pesticides and 27.5 kgs/ha fungicide, which are probably not being applied by all farmers. However, widespread coffee leaf rust and coffee berry disease problems in Tanzania require farmers to apply fungicides or suffer much lower yields (i.e. higher per hectare costs). For the 1991/92 cropping year, the World Bank study estimated the cost of a fungicide spray program for Arabica in Tanzania at 2 5 percent of direct production costs, and it attributes decreases in yields from around 400 kg/ha clean coffee in 1981/82 to some 230 kg/ha clean coffee in 1991/92 largely to the decline in the use of fungicides.

Since a comparison of actual amounts spent on chemicals is difficult due to such a large variation in the amount of chemicals actually applied (and poor data on actual input levels), perhaps it is more useful to compare the prices of these inputs across the three countries. Table 3.5 shows that these prices wer e remarkably similar in dollar terms in 1992, and showed no clear trend at the end of 1994. If anything, input prices appear to be slightly higher in Kenya than in Uganda, which is sur prising given Uganda's land-locked position. Unfortunately it was beyond the scope of this study to examine these issues in more detail, but it would be interesting to find out more about how competitive these farm input industries are in eac h country and the reasons for the price differentials (e.g. high transport costs, few competitors, etc.).

Table 3.5 Comparison of Input Prices in Capital Cities: 1992 and 1994

TYPE OF INPUT	Average 1992 Price ($/kg/l)			End 1994 Price ($/kg/l)		
	KENYA	UGANDA	TANZANIA	KENYA	UGANDA	TANZANIA
Fertilizer 　NPK 　CAN (kg)	.31	.34 .30	.18 .14	.45	.40	.17
Pesticide 　Summithion (l)	8.77	8.20	4.00	16.50	9.43	
Fungicide 　Dithane (l)	2.12	2.75	2.66	10.10	11.30	15.45
Herbicide 　Roundup (l)	4.89	4.95		15.30	12.90	9.80
Manure/Mulch			.03			

Sources: 1992 prices — Kenya: Ephanto, PAM Proceedings, June 1993, P. 187; Tanzania: World Bank, Tanzania Ag. Sector Memorandum, Nov. 1992; Uganda: Bank of Uganda Agricultural Secretariat, Nov. 1993. 1994 prices are CIF prices at Dar es Salaam, Kampala, and Nairobi obtained from chemical companies and Technoserve.

Comparative Labor Costs

In all three countries, family labor is estimated to constitute 70 to 80 percent of total labor employed i n coffee production. The opp ortunity cost of family labor can be estimated using either the hired wage rate, or returns to family labor in competing crops. Hired wage rates were very similar in 1992/93, a t approximately $.80/day in Tanzania and Uganda, and $.90/day in Kenya.

Comparative returns to family labor for coffee as well as several competing crops are shown in Table 3.6. Returns to labor in coffee were the highest in Kenya at over $4/day. Compared to a rural wage rate of around $1/day, returns under these very low input assumptions were very good. In Uganda, Arabica coffee ranked 11th in an analysis of returns to 28 food and cash crops, wit h Robusta ranking last (Bank of Uganda, 1993). Returns to nontraditional export crops such as cashew nut or vanilla were considerably higher. In Tanzania, coffee ranked last in an an alysis of returns to 15 different crops, with negative returns (i.e. even lower than the prevailing rural wage rate) (World Bank, 1992). This lar gely reflected the fact that food crop markets were liberalized earlier than coffee was, and free market prices were providing higher returns than were the still-controlled coffee crop. With a liberalized coffee market since 1992 and the recent stron g increase in world coffee prices, producer prices have increased significantly.

Table 3.6 Comparison of Returns to Labor for Coffee and Competing Crops

Crop	Country	Producer Price $/kg	Value of Output $/ha	Variable Cost $/ha	Gross Margin $/ha	Family Labor MD/ha	Return to Family Labor $/MD
Arabica	Kenya	0.49	1371	110	1261	270	4.67
	Uganda	.58	376	161	216	154	1.40
	Tanzania	.41	310	379	-69	270	-.26
Robusta	Uganda	.27	324	242	82	130	.63
	Tanzania	.13	200	236	-36	170	-.21
Cashew	Uganda	.39			508		1.81
	Tanzania	.26	293	115	179	90	1.98
Maize	Uganda	.12			116		.92
	Tanzania	.09	420	152	268	112	2.39

Comparative Policy/Regulatory Environments

Smallholder producers are affected b y policies that alter farm-gate prices, including how timely payments are made to producers, and the efficiency of cooperative post-fa rm operations. Recent market liberalization policies in Uganda and Tanzania have increased the percent of the realized export price that the farmers receives. This is a crucial step towards the revitalization of an industry t hat has witnessed increasing neglect and even uprooting of coffee trees due to extremely poor profitability and returns to farm labor.

The most important policy issues identified in PAM's study of the coffee industry in Kenya were the timing of payments to farmers to encourage appropriate input use and the percent payout level tha t represents the degree of post-farm efficiency. Sinc e the establishment of an "out-of-pool" system in Kenya (in May 1993), the timing of payments and quality incentives to farmers have improved. However, many of the Kenyan cooperatives are still run very inefficiently, at a high cost to farmers in terms of misse d profits. Compared to estate farmers, who receive on average 71 percent of the fob (Nairobi) price, many coffee cooperatives are still passing on only 56 percent of the export price to their members (Nyoro, June 1994).

Another important policy change in Kenya is allowing new mills to challenge the Kenya Planters ' Cooperative Union's monopoly over processing. This policy change, coupled with the February 199 4 announcement that farmers could retain 100 percent of their coffee sales in foreign currency, shoul d encourage production and improved husbandry practices. However, Kenya has not fully liberalized th e coffee market in terms of who can buy and sell coffee. Smallholders still have to sell their coffee through cooperatives who in turn have to sell it to KPCU for milling. During the study, some "illegal" coffe e

dealers were taken to court in Kisii for buying coffee from farmers and attempting to transport it and sell it in Uganda, where the recent market liberal ization has allowed private traders to purchase coffee directly from farmers.

The two most important policies that effectively taxed coffee producers in all three countries unti l recent years were producer price policies and fixed exchange rates (overvalued official exchange rate s increase the price of export crops in dollar terms). These policies are now a thing of the past in all three countries. Recent comparative advantage analyses for coffee in Ugan da and Tanzania revealed that the new Government policies were conducive to promote production of coffee. In other words, policies were n o longer implicitly taxing coffee farmers as they had in the past (World Bank, 1993, Bank of Uganda, 1994).

SUMMARY — LESSONS FROM COMPARING COFFEE COP

The comparison of COP across Kenya, Tanzania, and Uganda showed a lot of s imilarity when broken down into the major cost categories. For the low national ave rage yield assumptions in Uganda and Tanzania and the low input scenario in Kenya, total costs in each country were close to $500/ha. Coffee has been largely neglected by the majority of farmers in all three countries until recently due to low world prices and poor government policies coupled with cooperative inefficiencies that effectively kept producer prices at 5 0 percent or less than the realized export price (although in Kenya this has generally been higher, at 60-70 percent of the world price). This is reflected in declining yields and higher per hectare costs. This period of declining input use and yields has corresponded to the period of liberalization, particularly in Uganda and Tanzania, during which input subsidies were removed. In Tanzania, for example, the cost of producing Arabica coffee has subsequently risen in nominal terms from under $100/ha. in 1989 to over $500/ha. in 1992/93.

In terms of relative profitability a nd returns to labor, coffee fell substantially behind many other crops in all three countries as well. In Uganda, returns to non -traditional export crops such as chilies, vanilla, and cardamom have returns twice as high as coffee. In Tanzania, returns to family labor devoted to coffe e production were negative in 1993, compared to $2.40/day for maize. Kenya had the highest returns at over $4/day under low input assumptions, and over $8/day under high input assumptions. Compared to rura l wage rates of approximately $1/day, these returns are fairly high for smallholders. The Kenyan lesson is that higher input use and better management results in higher yields and better quality coffee, and it does pay off. Labor costs varied little across the three countries, at $.80 - $.90/day in 1992/93 (up to aroun d $1/day in 1994), with typically only 10-20 percent of labor used in coffee coming from outside the family.

Chemical input prices, often thought to be a major limiting constraint to higher input use and bette r crop husbandry practices, also varied surprisingly little across the three countries. Input use, however , varies significantly over time and between regions as well as countries, making actual cost comparisons difficult (i.e. chemical input costs/ha.). One informative comparison is between estate and smallholders' chemical input use levels in Kenya, where the large-scale farmers are spending up to 5 times as much on chemical inputs as smallholders and achieving yields up to 3.5 times as high (Crandall, 1993).

Since coffee remains such an important source of income for many smallholders as well as a vita l source of foreign exchange in all three countries, the policy implications arising from this comparative COP exercise are clear. There is continued work to be done in each country in the following areas:

- Increasing processing and marketing efficiency at the cooperative level.

- Promoting competition among traders and millers (i.e. making su re market liberalization steps are fully implemented).

- Committing increased resources to developing disease resistant and higher yielding coffee varieties.

- Research into smallholder practice s regarding use of chemical inputs to gain a better understanding of why such low levels are t ypically being used. It may be that with liberalization, chemical input prices are beyond the reach of many smallholders, and properly target ed input subsidies should be considered.

Given the similarity of the research needs of the coffee industry in Kenya, Tanzania, and Uganda, it may make sense to consider funding a regional coffee researc h center. This would avoid duplicative efforts and may be possible given the current policy environment and discussions of reviving the East Africa n Community.

The good news is that it appears that smallholders are currently responding to higher world coffe e prices quite quickly. They are once again spending time, effort, and money on their coffee trees an d increasing production. One of the implications of this is the fact that farmers will not bother to us e purchased inputs until they perceive the rewards are great enough (in this case, the world price — processing and marketing costs). However, East African producers still only produce around five or si x percent of world coffee output, and will remain residual players in the world market, unable to influence world price levels.

4. Comparative Cost of Production for Maize

Kenya, Uganda, and Tanzania

INTRODUCTION

Maize is by far the most important cereal crop in East Africa. It is the main staple food in most parts of Kenya and Tanzania. In U ganda, however, maize has not been widely adopted in the diet in most parts of the country, although it is becoming more popular among the urban population whose supply of th e traditional staples like *matoke* and millet is getting less and less reliable.

Maize produc tion in Kenya takes place on both large-scale and small-scale farms. Large-scale farms in Kenya account for about 20 to 30 percent of total production while smallholders account for 70 to 80 percent. Large-scale maize growing is concentrated in the Kenyan highland districts of Trans Nzoia, Uasin Gishu, Nakuru, and parts of Kisii (Sotik Settlement) and Kakamega (Lugari) districts. These large-scale farms are operated purely on commercial (profit-oriented) basis and employ high technology inputs like machinery, agrochemicals and other purchased inputs. Small-scale farms, on the other hand, tend to grow maize for subsistence requirements, with occasional surpl us for sale in good years. The level of technology employed on these farms varies, being higher in some areas than in others. Intercropping of maize with beans, millet, sorghum, and other minor crops is also a widespread practice among smallholders (se e Appendix 3 and Table A3.3 for Kenya). Data on intercropping for Tanzania and Uganda were not available and comparison on intercropping costs are therefore not included.

In Uganda and Tanzania, maize is produced mainly by smallholders using hand cultivation , occasionally supplemented by ox-cultivation or tractors.

The maize cost of prod uction analysis for each country is based on what is regarded as representative or average husbandry practices. In Uganda and Tanzania, this applies to an average smallholder. Th e analysis for Kenya, however, is presented for both large-scale and small-scale farming systems.

COMPARATIVE COST OF PRODUCTION ANALYSIS FOR MAIZE

Detailed COP tables for each of the countries are presented in Appendix 3. Here, the results ar e summarized and certain cost el ements highlighted in order to compare different cost categories across the three countries. Table 4.1 pr esents a comparison of the COP of maize in Kenya, Tanzania, and Uganda in 1993, and reveals the following:

- In terms of total cost of production per hectare, Kenyan large-scale farmers are the highest cos t producers of maize in the region, spending $770 per hectare. They are followed by smallholders i n Kenya who spend half that amount, or $390 per hectare. Ugandan smallholders with their low input technology come next with an estimated production cost of $242 per hectare. Tanzania, (at high input technology), turns out to be the cheapest producer in the region at $239 per hectare.

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- Costs per kilogram of maize produced differ from costs per hectare largely because of yield differences. When viewed in terms of production cost per kilogram of maize then the large scale farmers in Kenya together with smallholders in Uganda turn out to be the highest cost producers at $0.12/Kg. Smallholders' costs of production per kilogram of maize are very close in both Kenya and Tanzania with those in Kenya being slightly higher at $0.08/Kg (pure stand) and $0.07 (intercropped) while those in Tanzania are estimated at $0.05/Kg.

Table 4.1 Summary of Maize Cost of Production (US$): 1993

COST ITEMS	KENYA LS	KENYA SS	UGANDA U1	UGANDA U2	TANZANIA HIT ARUSHA
VARIABLE COSTS					
Labor Costs ($/ha)	37.49	60.14	141.30	141.30	86.00
Rank	1	2	4	4	3
Material/Intermed.					
Inputs ($/ha)	649.57	330.05	99.60	43.70	145.69
Rank	5	4	2	1	3
TOTAL VARIABLE COST					
$ per ha.	687.06	390.19	240.90	185.00	231.67
Rank	5	4	3	1	2
$ per kg.	0.11	0.08	0.12	0.09	0.05
Rank	4	2	5	3	1
FIXED COSTS					
$ per ha.	83.39	1.69	0.97	0.97	3.89
Rank	4	2	1	1	3
TOTAL COSTS					
$ per ha.	770.45	391.88	241.90	185.97	235.56
Rank	5	4	3	1	2
$ per kg.	0.12	0.08	0.12	0.09	0.05
Rank	4	2	4	3	1

Figures in brackets show ranking of each country, with (1) the lowest cost producers, and (5) the highest cost producers. LS — Large-scale farmers; SS — Small-scale farmers. U1 — use Author's assumptions regarding input use (land clearance necessary, pesticides are used and farmers must pay some interest on borrowed capital); U2 — input assumptions made by Sekabembe (1994) and Bank of Uganda (1993) (no land clearance, pesticides, or interest) — see Tables A3.1 - A3.5 for details and sources.

Labor Input Levels and Costs

The Uganda production system is the most labor intensive, with an estimated labor input of about 18 3 mandays per hectare (see Table 4.2). The Tanzanian production system foll ows the Uganda system in terms of labor utilization with an estimated rate of 127 mandays per hectare for low input technology, and 107 mandays per hectare for high inp ut technology. Kenyan maize producers are relatively low users of labor, at 84.5 mandays per hectare for smallholders and 56 man days for the large-scale farmers. Kenyan farmers, especially those operating on a large-scale, employ a lot of machinery services in their farm operations. Some smallholders also hire the services of farm machinery, especially for land preparation. This i s relatively rare in Uganda and Tanzania for smallholders. Ox-cul tivation for land preparation is also popular among smallholders in Kenya and Tanzania.

Table 4.2 Comparison of Input Use Levels Per Ha. in Maize Production: 1993

	KENYA		UGANDA	TANZANIA	
	Large Scale	Small Scale		Dodoma LIT	Arusha HIT
Labor (Mandays)	56	84.5	183	127	107
Rank	5	4	1	2	3
Fertilizers (Kg)					
DAP	185	50	0	0	0
TSP	0	0	0	0	0
SA/CAN	185	50	0	150	150
Seed (Kg)*	25	25	25	25	25
Insecticides (Kg)	7.4	0	2	5	5
Rank	1	4	3	2	2
Herbicides (Liters)	5	0	0	0	0
Machinery (Hrs)	High	Low	None	Low	Medium
Rank	1	2	4	3	2
Loans (Working Capital)	High	Low	Very Low	Low	Medium
	1	3	4	3	2
Gunnies (Bags)	70	55	20	45	50
Rank	1	2	5	4	3

Figures in brackets show the ranking of each country in terms of level of use of each type of input, with (1) being highest input use.

* For Uganda and Tanzania, some statistics and literature indicate that under low technology some farmers use as much as 40 kg of seed per hectare with no fertilizers, insecticides, or herbicides. Sources: See Appendix Tables A3.1 - A3.5.

Comparison of Levels of Utilization and Costs of Other Inputs

Tables 4.1 and 4.2 summarize material and other intermediate inputs used in producing maize in each East African country. From Table 4.2 it can be seen that Uganda, characterized by low input, labor-intensive technology, uses only the essential basic inputs like seed, gunny bags, and of course land, in the maize production process. The seed rate at 25 kg/ha is a similar rate that is universally found in all the three countries. However, because of low yields, the number of bags needed per hectare is comparatively low in Uganda.

The most striking feature in the case of Uganda is the non-use of yield-enhancing inputs such as fertilizers and other agrochemicals. Thus from Tables 4.1 and 4.2 it can be observed that Uganda registers the lowest expenditure on intermediate/material inputs, at $99.60/ha. This compares to Tanzania, at $146/ha, and Kenya, at a much higher $650/ha for large-scale producers, and $330/ha. on small farms.

The high input technology used in Kenyan maize production, especially by the large-scale farmers, involves liberal application of such purchased inputs as fertilizer, insecticides, herbicides and machinery

services. This explains why, on a per hectare basis, Kenyans are the highest cost producers in the region ($770/ha for large-scale farmers and $390/ha for smallholders).

Table 4.3 shows the 1993 average prices of inputs in the three countries. Wage rates are close in the three territories, but were slightly higher in Ug anda ($ 0.77/manday), followed by Kenya ($ 0.68/manday), and Tanzania ($ 0.67/manday). In terms of total labor costs, Uganda leads with high wage rates and labor-intensive technology, at an estimated expenditure of about $141/ha, followed by Tanzania and then Kenya.

Table 4.3 Comparative Prices/Cost of Selected Inputs and Labor Wage Rates (US$): 1993

		Prices per Unit (US$)		
INPUT	**UNIT**	**KENYA**	**UGANDA**	**TANZANIA***
Labor	Mandays	0.68	0.77	0.67
Rank		2	1	3
Machinery/Tractor Hire (for ploughing)	Ha	33.56	60.33	19.44
Rank		2	1	3
Ox-Plough Hire	Ha	30.20	33.78	16.67
Rank		2	1	3
Fertilizers				
DAP	Kg	0.41	.29	.15
Rank		1	2	3
TSP	Kg	0.36	.29	.15
Rank		1	2	3
SA/CAN	Kg	0.36	.29	.11
Rank		1	2	3
Maize Seed				
Hybrid	Kg	0.81	0.97	0.89
Rank		3	1	2
Local	Kg	0.18	0.19	0.19
Rank		3	1	1
Insecticide				
Dust	Kg	1.14	2.90	3.07
Rank		3	2	1
Liquid	Litre	8.31	11.58	4.00
Rank		2	1	3
Gunnies	Bag	1.02	0.10	0.11
Rank		1	3	2
Bean Seed	Kg	0.47	0.47	0.22
Rank		1	1	2

Numbers in brackets show the ranking of the countries, (1) being the most expensive, (3) the least expensive.

* According to the World Bank (1993), subsidies on Tanzanian fertilizers and other agrochemicals were phased out gradually from 1990-1994/95. By 1993 these subsidies were around 20 percent. Sources: Kenya — author's field survey; Nyoro (1993); Tanzania — WB Ag. Sector Memorandum (1992), adjusted using data from Mdadila (1993) and Binamungu (1993); Uganda — Bank of Uganda Agricultural Secretariat Report (1993).

One other thing worth pointing out is that because of her low input technology, Uganda realizes very low maize yields. This, coupled with relativel y higher wage rates, results in her cost of production per unit output of maize being the highest for smallholders in the region ($0.09 - $0.12/kg). It can be conclude d therefore that the use of yield-enhancing modern purchased inputs, as practiced by farmers in Kenya and Tanzania, result in higher yields per hectare which in turn lead to lower costs per kg of grain produced . That Ugandan farmers are still producing maize and exporting to Kenya, despite high production costs , implies that the farmers may be lacking an alternative cash crop, or producing for subsistence and onl y selling incidental surpluses without con sidering their costs of production or opportunity cost of their labor.

Comparative Analysis of Maize Gross Margins and Profitability

Maize production in East Africa is profitable but in varying degrees across countries. Even within a given country there exists variations in agronomic practices, yields, and in the product and input marke t conditions. These variations are large enough that observing significant differences in profitability levels is not uncommon. Like in any other business, profitability of maize production will depend on the yield levels, type and quality of inputs, and the prices of maize and inputs.

Table 4.4 summarizes average margins and profit levels realized by maize farmers in Kenya, Uganda and Tanzania in 199 3 on a per hectare basis. It also indicates in brackets the rankings of each of the three countries in terms of performance in earnings, gross margins and profits.

In terms of total revenue earned per hectare, Kenya leads at $1,164/ha. for large farms, and $924/ha. for small farms, followed by Tanzania ($556/ha.), and Uganda ($193/ha.). The differences in total revenue earnings are obviously explained by the high yield levels realized in Kenya and Tanzania compared t o Uganda, where farmers use low-input technology and achieve extremely low yields. (See Tables i n Appendix 3)

Table 4.4 Comparative Returns and Profitability for Maize Production Among East African Countries (US $): 1993

	KENYA		UGANDA		TANZANIA
PROFIT MEASURE	**SS**	**LS**	**U1**	**U2**	
Total Revenue	923.73	1,163.90	193.05	193.05	555.56
Price of Maize/kg	0.18	0.18	0.10	0.10	0.11
Gross Margins					
Per Ha	533.50	476.84	-47.85	18.52	323.87
Rank	1	2	5	4	3
Per Manday	6.30	8.52	-0.26	0.10	3.03
Rank	2	1	5	4	3
Profits					
Per Ha	533.50	393.45	-48.83	7.08	316.09
Rank	1	2	5	4	3
Per Kg	0.11	0.06	-0.02	0.004	0.06
Rank	1	2	4	3	2

Sources: Author's own compilation from field survey and secondary data. Gross margins and profits are ranked in brackets, where (1) is highest profits and (5) lowest profits. U1 — uses Author's assumptions regarding input use: land clearance necessary, pesticides are used and farmers must pay some interest on borrowed capital; U2 — input

assumptions made by Sekabembe (1994) and Bank of Uganda (1993): i.e. no land clearance cost, pesticide use, or interest charges — see Tables A3.1 - A3.5 for details and sources. See Appendix Tables A3.1 - A3.5 for details.

The gross margin analysis, on per hectare or per man-day basis, shows a similar pattern, with Kenya leading again and Uganda with very low or negative gross margins (revenues - variable costs). Analysis of profit levels (revenues - total costs) reveals that on per hectare and per kilo basis, Kenyan producers are making higher profits than Tanzanian farmers who are in turn making more money than Ugandan smallholders.

Maize price levels are highest in Kenya followed by Tanzania and Uganda. However, input prices are highest in Uganda followed by Kenya and Tanzania (Table 4.3). It would appear therefore that high yields and high maize prices, coupled with moderate input price levels, make Kenyan farmers earn higher profits in maize than their counterparts in Uganda and Tanzania. Tanzanian farmers, on the other hand, with relatively high maize yields and low input prices, realize better profits per hectare than Ugandan farmers who get very low to negative profits per hectare or per kilogram of maize produced. Unless the Government of Uganda adopts yield enhancing policy incentives like extension services and breeding of high yield varieties, maize production in Uganda will remain unprofitable and will only be carried out by noncommercially minded farmers who do not put high opportunity cost to their family labor or who do not use borrowed capital. As noted already, the widespread belief that Ugandan soils are fertile and need no fertilizers needs to be addressed by a more aggressive extension effort and an improved fertilizer distribution system.

Comparative Policy/Regulatory Environment

In the past, all three countries had strict regulatory controls over marketing and pricing of maize. These policies were inherited from the past colonial governments, and resulted in the marketing of the grain by a monopoly parastatal. Direct government regulation and fixing of producer prices offered by such parastatals often suppressed the farm-gate prices far below levels that would have prevailed in the case of a free market. Such prices also tended to be uniform,(i.e. pan-territorial and pan-seasonal) across the country. It has been argued that these policies often discouraged farmers who then reduced maize production (Lofchie, 1989, Odhiambo, et al, 1994).

With the recent adaptation of the SAPs, and the subsequent market liberalization in the three countries, maize marketing has been freed of all government and parastatal regulatory restrictions. The free trade regime has excited both producers and traders who feel they now have some incentives to engage in maize production and marketing as a business undertaking. The impact of the Structural Adjustment Programs on maize and other grain marketing has not been documented, but early indications are that the incentive structure is there both at the farm level and at the market level. Farmers and traders in Uganda and Tanzania seem to find the new found freedom encouraging. In Kenya, the initial reactions from both farmers and traders was one of optimism. However, of late (1994) Kenyan farmers have been heard to complain of being unable to compete with cheap maize imports coming into the country. In response the Government of Kenya imposed a temporary ban on maize imports in August 1994 which has since been replaced by the imposition of a variable duty levy on such imports as a protection to the local farmers.

SUMMARY — LESSONS FROM COMPARING MAIZE COP

The COP analysis shows that maize production in East Africa is carried out under varying levels of input use technologies and standard of crop husbandry. The levels of cost and profits also vary considerably. The high levels of input use and good crop management found among the large scale farmers and some smallholders in Kenya result in higher yields and higher profits per hectare. Tanzanian farmers practicing

medium to high input technology come second to Kenya in terms of yields and profitability in maiz e production.

However, in terms of costs per hectare, the use of yield enhancing purchased inputs as practiced b y some Kenyan and Tanzanian farmers leads to relatively higher costs, compared to those of thei r counterparts in Uganda who currently do not use such inputs. On the basis of costs of production pe r Kilogram of maize, the study indicates that Uganda with her low input levels and yields is a higher cost producer than Kenya and Tanzania. There is ro om for improvement in the production of maize in Uganda. There is therefore need to institute research and extension policies that would help improve crop husbandry and yields at the farm level. The implications of this is that the Ugandan government and donor agencies should look into the following areas of policy:

- Investment in maize research to produce high yielding varieties that would be made available t o farmers. Currently, the majority of Ugandan farmers use local (unimproved) maize seed. Mor e research should also be concentr ated on agronomic practices that could be developed as a package for farmers.

- Developing a strong extension service to advise farmers on r ecommended practices for maize growing.

- Developing marketing infrastructure and market information for both inputs and maize. This wil l ensure that farmers can get the inputs readily and also sell their products at profitable prices.

For Kenya and Tanzania, more efforts should be made and incentives provided to bring mor e smallholders to higher yield levels comparable to smallholder yie lds used in this study for Kenya. One such policy incentive is the development of appropriate marketing infrastructure and a market informatio n system that includes inter-regional markets.

Finally the problem of seed production could be tackled as a regional issue where by the three Eas t African countries with the help of donor funding could embark on regional collaborative research in maize breeding and production of new hybrids for the various agroecological zon e in the three countries. Presently Kenya has developed many hybrid varieties which could be bulk ed in adequate quantities for commercially distribution to Uganda and Tanzania. The Kenya Seed Company could be expand to produce maize seed for the whole region. Alternatively, more private seed companies could be encouraged to work on see d production for the East African region. In Zimbabwe for example, an American Seed Company has just started seed production on a large scale for the Southern African region and the feasibility of a simila r project could be looked into for East Africa.

5. Comparative Cost of Production Analysis for Beans

INTRODUCTION

Beans in all the three countries of East Afric a has been largely regarded as a smallholder subsistence crop. However, its production is now so widespread that in some parts of Eas t Africa it has managed to grow into an important cash crop planted to supplement farm incomes from traditional crops.

COMPARISON OF TOTAL AND VARIABLE COSTS FOR BEANS

As is the case with maize, the cost of production analysis for beans for each country is discussed in more detail in Appendix 4. Table 5.1 presents the comparati ve analysis of COP for beans in Kenya, Uganda, and Tanzania. It shows, as in the case of maize, that Kenya is the highest cost producer of beans in the region on per hectare basis. A pure stand of beans costs about $392/ha. to produce in Kenya, compared to $207-$232 in Uganda, and $91-$93 in Tanza nia. When analyzed on the basis of cost of production per kilogram of beans produced, the low yields achieved by Ugandan farmers resu lt in the highest costs at $.26 - $.29/kg. Kenyan beans are produced at a cost of around $ .18/kg for pure stand and $0.07/kg for intercropped, while in Tanzania pure stand beans cost approximately from $0.07 - $.09/kg to produce. No data were available on intercropping production systems for both maize and beans in Uganda and Tanzania, although th e practice is widespread in the two countries.

The cost of purchased inputs used in Kenya may make it the most expensive bean producer on a per hectare basis. However, Uganda, with its labor-intens ive production system coupled with a high wage rate, turns out to be the highest cost producer on a per kilogram basi s, despite negligible use of purchased inputs. One of the assumptions behi nd the Uganda COP budget was fairly high fixed costs relative to the budgets for Kenya and Tanzania (U1 in Table 5.1). Since there was no apparent reason why this should be so, this cost element was reduced for this analysis (U2 in Table 5.1). Even when fix ed costs are assumed to be zero, Uganda remains the highest cost producer of beans in the region.

Analysis in terms of variable costs gives a similar picture to the total cost comparison analysis. Kenya's total variable cost are more heavily weighted by materi al intermediate inputs and less by labor costs. In the case of Uganda, the greatest proportion of total variable costs is a ccounted for by labor. Total variable costs in Tanzania are relatively low, a nd it still stands as the least cost producer when judged on a total variable costs criteria. Fixed costs, as expected under smallholder conditions, are negligible in Kenya and Tanzania, and as explained above, were quite high (at $18/ha.) in the Uganda budget, but reduced for the purposes of this comparative analysis.

Table 5.1 Summary of Beans Cost of Production (US$/ha): 1993

COST CATEGORY	KENYA Pure Stand	KENYA Inter-cropped Maize/ Beans	UGANDA U1	UGANDA U2	TANZANIA HIT	TANZANIA MIT
Labor						
Physical (Mandays)	106	73.5	180	170	39	87
Rank	4	2	6	5	1	3
Financial ($/ha)	71.86	44.19	139	131.27	21.44	38.67
Rank	4	2	6	5	1	3
Material/Intermediate Inputs	318.10	166.64	75.11	75.11	67.28	49.97
Rank	5	4	3	3	2	1
TOTAL VARIABLE COSTS						
$ per ha.	389.97	210.85	214.11	206.38	88.77	88.64
Rank	6	4	5	3	2	1
$ per kg.	0.18	0.07	0.28	0.26	0.07	0.09
Rank	3	1	5	4	1	2
FIXED COSTS	1.69	0.85	17.86	0.97	3.89	1.95
	3	1	6 *	2 **	5	4
TOTAL COSTS		211.69				
$ per ha.	391.66	4	231.97	207.35	92.60	90.59
Rank	6	0.07	5	3	2	1
$ per kg.	0.18	1	0.29	0.26	0.07	0.09
Rank	3		5	4	1	2

Figures in the second row show the ranking of each country, where (1) is the lowest cost producer, (6) is the highest cost producer.

For ease of calculation the cost per kg for the intercropped beans includes an average for maize and beans produced in the intercrop system. Note that per kg cost of maize and beans is reduced under intercropping.

Sources: See Appendix Tables A4.1 - A4.4. Maize-beans intercrop budget is found in Table A3.3.

*Since these fixed costs seem high for Uganda (as reported in Bank of Uganda Agricultural Secretariat Report, 1993), under U2 they are assumed to be equivalent to those of maize ($.97/ha.)

COMPARISON OF LABOR INPUT LEVELS AND COST FOR BEANS

As seen in Table 5.1, Uganda has the most labor-intensive bean production system. Since wage rates are also highest in Uganda, it follows that Uganda must also lead in term s of labor costs. Ugandan smallholders use about 180 mandays/ha at a cost of $139/ha, compared to 73.5 to 106 mandays/ha in Kenya (at a cost of $49 - $72/ha), and 39 - 87 mandays/ha in Tanzania (costing $21 - $139/ha). Even if mechanization and chemical inputs were easi ly available at a reasonable cost, bean production is still bound to remain a very labor-intensive undertaking in the region in terms of weeding, harvesting, threshing, bagging and handling.

COMPARISON OF LEVELS OF UTILIZATION AND COSTS OF OTHER INPUTS IN BEANS PRODUCTION

One striking feature in the production of beans in Africa is that it currently attracts very little use o f purchased inputs like fertilizers, fungicides and insecticides (Se e Table 5.2). Nowhere is this situation more pronounced than in Uganda where the major inputs are merely the basic traditional inputs of land and labor, and to a limited extent, gunny bags for transportation and marketing purposes.

The situation is slightly different in Kenya, where under purestand high-input technology, som e purchased inputs are being used on some f arms. The Tanzanian case is similar to that in Kenya, especially under the medium to high-input technology situations. Of course not all farmers in Kenya practice hig h input technology; indeed there are several low or poor husbandry types of bean production systems i n Kenya that do not do any better than the farmers in Uganda. As a matter of fact, Ugandan farmers ar e blessed with good land and more favorable climatic conditions and with good husbandry practices, their bean farmers could out-perform the poorer farmers in Kenya and Tanzania.

COMPARATIVE PROFITABILITY

Profits are a function of fluctuating yields, output and input prices, and can be very tricky to analyze and compare across countries, especially for a crop such as beans, which is first and foremost considered a subsistence crop. However, using an imputed wage rate for farm family labor, profitability of beans i s calculated for each of the three countries and the details presented in Table 5.3.

Kenyan bean producers had the highest profits in 1993, with a g ross margin (GM) of $654/ha, followed by Tanzania (GM of $31 to $75/ha), then Uganda with a negative GM of between $-0.33 and $-0.26 per hectare. Gross margins per manday, also a good measure of profitability and returns to family labor, are also presented in Table 5.3. Here again, Kenya lea ds with returns to labor of $6/day, followed by Tanzania at $1.93/day, and Uganda at $-0.15 to $-0.19/day.

Table 5.2 Comparison of Physical Input Use Levels in B ean Production in E. Africa: 1993

INPUT TYPE	KENYA Pure Stand s	Intercrop Maize/Bean	UGANDA U1	U2	TANZANIA MIT	HIT
Labor (Mandays)	106	73.5	180	170	87	39
Material Inputs						
Fertilizers						
DAP (Kg)	0	100	0	0	0	0
TSP (Kg)	185	0	0	0	0	0
SA/CAN (Kg)	0	0	0	0	0	50
Seed	35	40	60	60	60	60
Insecticides						
Dust (Kg)	0	0	0	0	0	0
Spray (Liters)	7.5	0	0	0	0	0
Fungicides (L)	7.5	0	0	0	0	1
Herbicides (L)	0	0	0	0	0	0
Gunnies	24	14	8	8	10	12
Transport (Bags)	24	14	8	8	10	12
Tractor and						
Machinery Services	Medium	Medium	Low	Low	0	Medium

Source: Author's own compilation from Tables A4.1 to A4.4 in Appendix 4

Turning to overall profitability, the situation remains virtually the same as the gross margin analysis. Kenya still leads with profit levels of $652/ha ($0.30/kg), for pure stand or $472/ha (0.15/kg) fo r intercropped beans, followed by Tanzania with profits of $31-$71/ha or $0.03-$0.06/kg, then Uganda with negative profits at -$66 to -$35 per ha or -$0.06 to -$0.03/kg. It is evident from the analysis tha t profitability of beans production is very much tied to the level of crop husbandry and modern input us e which influence yields. The higher yie lds obtained by better management practices more than compensate for the higher costs. From this observation, it can be concluded that a country like Uganda with abundant land resource and rains can still improve its bean output and profitability both at the farm level an d nationally by encouraging widespread distribution and adoption of modern purchased inputs and goo d husbandry among its farmers. As can be seen in Table 5.3 and Table A4.5 in Appendix 4, average yields are very low in all three countries. With improved varieties, good husbandry, and good pest and disease control, better yields could be achieved and profitability and returns to labor much improved.

Table 5.3 Comparative Profitability of Bean Production ($/ha and $/kg): 1993

	KENYA		UGANDA		TANZANIA	
	Pure Stand	Intercropped with Maize	U1	U2	MIT	HIT
Yields	2,200	662	800	800	1,000	1,250
Bean Prices	0.47	0.37	0.23	0.23	0.12	0.12
Gross Margins						
$ per ha	654.10	473.29	-33.41	–0.25	31.36	75.16
Rank	1	2	6	.69	4	3
$ per day	6.17	6.44	-0.19	-0.15	0.36	1.93
Rank	2	1	6	5	4	3
Profits						
$ per ha	652.40	472.44	-66.40	-34.52	31.36	71.28
Rank	1	2	6	5	4	3
$ per kg	0.30	0.15	-0.06	-0.03	0.03	0.06
Rank	1	2	6	5	4	3

Figures in the second row show ranking, where (1) is the highest profits/margins and (6) is the lowest.

Sources: see Tables A4.1 - A4.4 in Appendix 4 and Table A3.3 for intercropped beans in Kenya. The Kenyan bean price was KShs. 28 (or $0.47) for pure stand and KShs. 22 (or 0.37) for intercropped.

SUMMARY — LESSONS FROM COMPARING BEANS COP

Beans production in East African is basically a smallholder enterprise and in most cases it is regarded as a subsistence crop. Production typically involves little or no use of purchased inputs. This is particularly so in Uganda where the only inputs employed are land, labor, and seed, which subsequently results in very low yields and a high cost per kilogram of beans produced. As was noted for maize, the case of low input use by bean farmers in Uganda can in part be attributed to the widespread belief that soils in Uganda are too fertile to require the use of fertilizers and other yield-enhancing inputs. Again, input marketing an d distribution is limited and inefficient in rural areas of Uganda, restricting farmer's access to such inputs.

In Kenya and Tanzania as well , the majority of the farmers producing beans as a subsistence crop use little or no purchased inputs. However, in these two countries there are some farmers who use moderate to high levels of purchased inputs. One outcome of the CO P analysis is the observation that with high input levels, yields and profits improve to almost double despite the fact that such inputs raise the cost o f production. For example, material input cost for pure stand beans crop in Kenya accounts for about 8 0 percent of the total cost as compared to 32 percent for Uganda. The profits for the Kenyan case are more than one and a half times those for Uganda farmers.

As with maize, the policy implications of these findings are that:

- There is room to expand beans p roduction in Uganda through encouraging farmers to adopt the use of purchased inputs like fertilizers, fungicides and insecticides;

- Research needs to be carried out on seed improvement and agronomic practices;

- More must be done in terms of impr oving extension services to encourage farmers to adopt good crop husbandry in order to improve their yields.

Admittedly, many smallholders in Kenya and Tanzania als o still use little or no purchased inputs in the production of beans. They too require government policy incentives that would help them adop t recommended practices and boost their yields so as to earn higher profits from beans. The recent market liberalization in the three countries will definitely he lp farmers get good prices but other incentives like the development of market infrastructure and a good marketing information system will be required to make the market more transparent and efficient. Kenya and Tanzania h ave already embarked on the development and strengthening of agricultural marketing information services, with market prices broadcast over th e radio and published in the newspapers, and hopefully such services will be improved and sustainable in the long-run.

6. Comparative Cost of Production Analysis for Potatoes

Kenya, Tanzania, and Uganda

Potatoes were chosen for this study as a represen tative vegetable crop that has been growing in importance in East African's diets in recent years. It is typically grown for both home consumption and for sale, with farmers retaining part of the crop for seed. In some areas (such as Meru in Kenya), potato farmers ar e much more commercialized, producing primarily for sale.

Kenya produces more potatoes, in total tons, than any of its southern, eastern, or central Africa n neighbors, at 730,000 tons, or 32.6 kgs/capita/year (FAO Production Yearbook, 1988). Tanzania produces 9 kgs/capita/year (223,000 tons), and Uganda produces 9.7 kgs/capita/year (158,000 tons).

Potato production is most suited to elevations of between 1500 and 2500 meters. In Kenya, this area is concentrated along the high points of the Rift Valley, around Mount Kenya, and in the Aberdar e Mountain Range. In Uganda , potatoes are found primarily in Kabale district near the Rwanda border, and in the highland areas in easter n Uganda near Mount Elgon. In Tanzania, the major potato production zone is the Southe rn Highlands, and they are also found in the higher elevation area near Arusha (Moun t Kilimanjaro). In the higher elevation areas of all t hree countries (above 2,000 meters), three crops per year are possible depending on rainfall distribution. At lower elevations two crops per year are typical. In the Arusha area of Tanzania, there is a unimodal rainfall pattern allowing only one potato crop per year.

The potato is a fast ma turing crop with harvesting possible two months after planting. In the highland areas where farmers can complete three cropping seasons of potatoes in a year, potatoes produce seve n times more ki lograms per hectare than maize, which takes 9 to 12 months to mature. Therefore, potatoes replace maize as the main source of starch in many of these areas.

SMALLHOLDER POTATO PRODUCTION

Most of the potato production in Eastern Africa comes from smallholders. In Uganda, the average farm size for potato producers is 10 acres, with an average potato plot size of .25 acres. Nearly 75 percent of Kenyan potato farmers are cultivating on less than two hectares (4.5 acres) of land.

The potato crop is fairly difficult to grow, and is quite demanding with respect to disease and pes t control and soil fertility. A sound crop rot ation can be an effective means of satisfying these demands, and it is recommended that potatoes be planted not more than once in four seasons. However, due to lan d shortage and population pressure, this recommendation is not f ollowed in all regions or by all smallholders.

POTATO COST OF PRODUCTION BUDGETS

Unfortunately, secondary potato COP data was unavailable for Uganda and Tanzania, making a cross - country comparison impossible without first undertaking farm-level surveys. Secondary COP data wa s available for Kenya (from the PAM team), and will become available shortly for Uganda, where a farm-level survey of potato producers has just been finished.

The PAM data provides an informative look at comparative COP across three different districts i n Kenya, and contrasts irrigated versus nonirrigated techniques. The Kenyan COP budgets are reproduced in Table 6.1.

Table 6.1 Comparative COP Budgets for Potatoes — 1993, Kenya — Nyeri, Narok, and Nakuru Districts (KShs/acre/year)

TYPE OF INPUT	NYERI*	NAROK*	NAKURU**
VARIABLE INPUTS			
Fertilizer (DAP)	6300	2400	2910
Insecticides/Fungicides	5400	0	1424
Seed (local)	12000	8000	6480
Manure/Mulch	2400	63	0
Transport	0	1260	1400
Working Capital	1172	798	798
FIXED INPUT COSTS (ANNUALIZED)	3440	0	0
LABOR COSTS	5760	5760	5213
TOTAL COST	42102	19958	18153
TOTAL REVENUE	120000	51600	30805
Profit (TR-TC)	77898	31642	12652
Profit — irrigated cabbage***	83700		
Profit — irrigated tomatoes***	200328		

2 seasons/year and irrigated

*** 1 season/year*

**** competing crops*

Yield assumption: 60 bags (130kgs)/season = 15,600 kgs/acre/year (15.6 tons/acre/year)

Normally yields are higher in Nyeri (irrigated potatoes); 1993 was a very dry year with water rationing in effect.

An analysis of the returns to potato production shows that potatoes have quite a high return, although returns to 2 major competing crops in Nyeri, tomatoes (for canning) and cabbage were higher in 1993 . Coffee returns in Nyeri were half the returns to potatoes in the same year.

Comparison of Potato Yields

As can be seen in Table 6.2, actual yields obtained in 1993 were well below potential yields in all three districts, although it was a dry year, particularly in Nyeri district. However, indications are that low input use and poor seeds are significant contributing factors to historically low potato yields in Kenya.

Table 6.2 Comparison of Actual versus Good Smallholder Yields

COUNTRY	ACTUAL 1993 YIELDS, KGS/ACRE	GOOD YIELDS, KGS/ACRE
Nyeri (irrigated)	7800	10400*
Narok	5200 - 7800	13000
Nakuru	6110 - 7930	19500

* yields in an average year; good yields would be even higher (up to 20,000 kgs/acre).

Comparative Chemical Input Costs

The first chemical input potato producers are likely to use is fungicides, because they recognize the fact that it pays off (P. Ewell, CIP, perso nal communication). While average Kenyan yields are in the range of 7-9 tons/ha., with the proper use of fungicides and fertilizer (nitrogen and phosphates being the mos t important), yields of 20 tons/ha. are obtainab le. There are still many producers in all 3 countries, however, that are not regularly applying either input. Good quality seed is the other important input.

Late blight and bacterial wilt are the most serious dise ase problems faced by potato farmers in all three countries. Bacterial wilt is more of a problem at lower elevations, and is currently being faced in Uganda where there is increa sing production at lower elevations (closer to urban-consuming areas), and therefore a new demand for better seeds and disease-resistant varieties. Late blight, a fungal disease, can b e controlled with fungicides, but may require several sprayings per year, making it expensive.

Table 6.3 Comparison of Fungicide Cost: 1993

TYPE OF INPUT	Average 1993 Price ($/kg/liter)		
	KENYA	UGANDA	TANZANIA
Dithane M45 (kg)	12.06	8.97	11.55
Ridomil (liter)	25.74		
Milraz (kg)	22.46		
DAP Fertilizer (kg)	.41		

1993 Average Exchange rates: Kenya: 59 KShs = $1, Uganda: 1036 UShs = $1, Tanzania: 450 TShs= $1

Availability of High Quality Seed

One of the biggest constraints to increased potato production (and better quality potatoes) in all thre e countries is the lack of availability of high quality seed potatoes. This is a policy issue since see d propagation has been the responsibility of the government in each of these countries. For example, seed multiplication and distribution have been the primary roles of the government parastatal Agricultura l Development Corporation (ADC) Farms in Molo, Kenya. Big commercial s eed companies have never been involved in vegetatively propagated crops for various r easons. Some African countries, such as Sudan, rely on European imports for seed potatoes.

Kenya is currently trying to contract directly with farmers to produce seed potatoes, but is facing two major problems:

- There are a series of extra management steps required in producing good quality seeds — e.g . periodically checking and marking plants with bacterial wilt — that require farmers to be well trained (and be willing to expend the extra labor required).

- When the market price of fresh potatoes gets high, most farmers are not willing to hold on to thei r potatoes to use as seed, but sell them immediately (P. Ewell, CIP, personal communication).

LESSONS FROM POTATO COST OF PRODUCTION

Although the secondary data was limited, this cursory analysis has indicated that there are some problems that need to be addressed with respect to potato production in East Africa:

- There is a need for more farm-level research in Uganda and Tanzania, where potatoes are an important crop, but little is known about farm-level practices and constraints.

- The availability of high quality seed appears to override any other constraints, making it a top priority for governments and donors to address.

- A study of chemical input use would be useful in order to determine if cost of inputs is truly a constraint and if input subsidies (properly targeted) may be needed.

7. Costs of Production in the Textile Industry

INTRODUCTION

Presented in the sections below is an analysis of costs of production in the textile industry in East Africa. Given that the other commodities under analysis were agricultural, it was decided to include an industrial commodity for comparison. The textile industry was selected because of its relative importance i n manufacturing in all the three countries and its potential for growth and export earnings. A comparative analysis of costs of production in the reg ion was undertaken and the policy implications of the findings for governments and donors examined.

COSTS OF PRODUCTION OF TEXTILES IN EAST AFRICA

Defining a suitable methodology for measuring and comparing costs of production across countries i s critical to the utility of the analysis that is performed. Analyzing the textile industry is quite complex due to the variety of products, technologies, and type and size of firms in the industry. For the purpose of this study the scope of the textile sector will include both woven fabric and garments. For the purpose o f analysis, however, the cost structure of fully integrated mills was analyzed. More specifically, th e consultants examined the costs of producing 200 grams of 100 percent cotton fabric of one meter length. [6] In all three countries, actual cost data was collected from firms that can be considered reasonabl y representative of the general cost structure in the industry. The sel ection in Uganda and Tanzania was made slightly more difficult due to the general low level of production and capac ity utilization in the sector. Some of the best performing firms were selected in these countries. In addition to the cost data obtained from the firms, secondary data on costs of production in industry, and textiles in particular, was examined an d compared to the data obtai ned from the firms to ensure its validity and representativeness. Various textile manufacturers in the region were also interviewed to cross-check the data collected and to identify other cost constraints faced by firms.

The cost structure obtained in Tanzania and Uganda was from firms that are majority owned by the government, but with significant minority ownership from overseas investors. In contrast, the cost dat a from Kenya was from a fully privately owned firm. This distinction should be kept in mind as one might expect the cost structure to be more efficient in the private firm vis-a-vis the publicly owned firms.

All the firms analyzed are labor-intensive, employing over 300 workers and producing mostly for the domestic market. Capacity utilization rates varied acros s the firms analyzed with Kenya's being the highest

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[6] Although a large number of firms in East Africa (Kenya in particular) are increasingly using synthetic fibers in the production process, it was decided for the purpose of this analysis to exclude synthetics in our unit of analysis for ease of comparison with other countries. In addition cotton is still the largest input for most mills in the region and will increase overtime because (I)global trends show a shift towards cotton based products ,(ii) as cotton production improves in the region due to liberalization of the industry, firms will reduce their use of synthetics in favor of cotton particularly those involved in production for export.

in 1993 and Uganda's being the lowest. This factor should also b e kept in mind as lower capacity utilization rates affect the cost efficiency of a firm. [7]

For the purpose of the analysis conducted, it is assumed that the technology used is similar acros s countries and is fixed since it was not possible to do a detailed assessment of the technology used in each firm analyzed and in the regio n in general. It will therefore not be possible to make definitive conclusions on the impact of technology on costs of production in the region. However, a llusions will be made wherever it is deemed relevant on the impact of technology on costs of production.

Due to the small sample size used for the analysis, the costs obtained can only be considered a s indicative and not representative of the entire sector. They are neve rtheless useful for comparative purposes and will help to identify key cost constraints faced by the industry in the region and possible areas o f intervention by governments that would help to improve industrial competitiveness.

Presented in Table 7.1 below is a summary of the main cost elements required to manufacture 10 0 percent cotton fabric of 200gms/square meter. The elements are aggregated into key cost components for ease of comparison with other countries. More detailed cost budgets for each country are presented i n Appendix 5 to this study which will help to clarify how the various costs were compiled.

A cursory look at the costs for each country in comparison to the others reveals that the total cost of production is highest in Ta nzania, followed by Uganda and then Kenya. However, components within the cost structure va ry across the countries in a number of areas. For example, the share of cotton in tota l production costs is much higher in Kenya than in the other two countries. In order to determine why these differences occur, it is necessary to examine the prices of the various inputs and compare them acros s countries. Ideally, it would also be important to examine the level of input use, however, it was not possible to get detailed data in this area. The manufacturers themselves were interviewed and asked to identif y levels of input use, and this coupled with secondary price information was used to give some indications of the costs involved and the reasons for differences between countries.

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[7]   Capacity Utilization rate of the Kenyan firm was approximately 75 percent in 1993; the Tanzanian firm was 48 percent in 1993 and the Ugandan firm was 20 percent in 1994. Figures for the Ugandan firm were higher in 1993, but came down in 1994 because the firm was earmarked for privatization and as a result the banks stopped lending it money. In 1994, the firm had to reduce output considerably, despite the high quality of its products.

Table 7.1 Cost of Producing 200gms/Square Meter of Cotton Fabric (US$)

COST COMPONENT	UGANDA		KENYA		TANZANIA	
	Cost	%	Cost	%	Cost	%
Cotton	0.433	21.5	0.74	42.8	0.53	21.95
Chemicals	0.188	9.3	0.17	9.66	0.46	19.01
Direct Labor	0.147	7.3	0.52	30.14	0.26	10.68
Utilities	0.302	14.9	0.18	10.30	0.5	20.52
Other Overhead	0.681	33.7	0.02	0.98	0.63	26.13
Depreciation	0.266	13.2	0.11	6.07	0.04	1.66
Total	2.017	100	1.74	100	2.42	100
Cost of Capital[8]	1.55					
TOTAL	3.57					

Definitions

Cotton: *Includes the cost of cotton lint and transport costs.*

Chemicals: *Includes the costs of both dyes and chemicals.*

Direct Labor: *Includes the costs of direct labor used in the manufacturing process (spinning, knitting and bleaching). For Kenya the costs also include indirect labor costs.*

Utilities: *Includes the costs for water, fuel and electricity; for Kenya it also includes costs for rent on plant and equipment.*

Other Overhead: For Kenya this includes auxiliary costs and costs for spare parts; for Uganda this includes costs for administration, marketing, and factory overhead; for Tanzania this includes cost for administrative overhead including telecommunications, insurance, legal expenses and other related expenses.

Depreciation: *Includes depreciation on plant, equipment and machinery.*

Cost figures were obtained in 1993 for Kenya and Tanzania and June 1994 for Uganda. The following exchange rates were used:

Kenya: *1US$ = Kshs.68*

Uganda: *1US$ = Ushs.1020*

Tanzania: *1US$ = Tshs.450*

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[8]   Data on costs of capital was only available for Uganda.

Cotton

The price of cotton in Kenya is clearly m uch higher than the price of cotton in Uganda or Tanzania (Table 7.2). This explains why the percentage costs of cotton in total production are much higher in Kenya than for Tanzania or Uganda. As Table 7.1 shows, cotton compr ises 42.8 percent of total production costs in the case of Kenya as compared to 18.9 percent for Uganda and 21.9 percent for Tanzania respectively.

Table 7.2 Prices of Cotton Lint in East Africa

	KENYA	UGANDA	TANZANIA
Domestic Price ($/kg)	$2.09	$1.51	$1.43
Import Price[9] ($/kg)	$1.83		
Transport	$0.12		
TOTAL	$1.95		

Lint prices for Tanzania, 1993/94; lint prices for Uganda, June 1994, lint prices for Kenya, October 1994

EXCHANGE RATES USED

Kenya: 1US$ = 43Kshs.

Uganda: 1US$ = 930Ushs.

Tanzania: 1US$ = 520Tshs.

An area of concern for Kenyan manufacturers and policymakers is the high cost of cotton in relation to other countries. The major reason for this is the decline in the cotton industry in Kenya over the last five to ten years. As a result, the supply of cotton is insufficient to meet local demand and the local price for cotton is higher than the international price, inc lusive of transport (in this case from Mwanza in Tanzania). Manufacturers are therefore forced to import cotton from neighboring countries at a higher cost, thu s reducing overall compe titiveness. In fact, a major reason for the lower capacity utilization rates in Kenya (66 percent in 1993) is because of the lack of sufficient raw material inputs, particularly cotton.

Dyes and Chemicals

There are a number of dyes and chemicals used in the textile production process including acetic acid , hydrochloric acid, caustic soda and hydroge n peroxide. For the purpose of this analysis, two chemicals are singled out and examined to identify how their prices differ across countries (Table 7.3).

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[9]   Most cotton imported into Kenya is from Tanzania. Uganda and Tanzania do not import cotton.

Table 7.3 Cost of Chemicals in East Africa

CHEMICAL	KENYA	UGANDA	TANZANIA
ACETIC ACID			
Price (US$/ton)	410	410	410
Duty (%)	20	10 [10]	10
VAT (%)	18	None on Raw Mat.	—
Transport (US$)	—	140	—
TOTAL (US$)	565.8	591	451
HYDROGEN PEROXIDE			
Price (US$/ton)	600	600	823.6
Duty (%)	20	10	10
VAT (%)	18	—	—
Transport (US$)	—	140	—
TOTAL (US$)	828	800	906

As Table 7.1 highlights, the percent of dyes and chemicals to costs of production is much higher i n Tanzania than in Kenya and Uganda. The available evidence from examining prices is conflicting. Th e price of acetic acid in Tanzania is lower than in the other two countries. The price of hydrogen peroxide is considerably higher in Tanzania than in the other two countries. Prices may not be indicative of the actual level of use, however. It may be that in the firm examined in Tanzania there is a much higher level of use per meter of cloth than in the firms examined in Uganda or Kenya. A more detailed analysis of costs of all dyes and chemicals used in the production process and the level of input use in the three countries should be done in order to identify why dyes and chemicals add proportionately more to the costs of production in Tanzania than in the other two countries.

When comparing prices in Uganda and K enya, it is interesting to note that prices are generally similar in both countries despite the transport charges that Uganda has to face. This is because the duty and VAT in Kenya adds 38 percent to the price of the input. This however can be r eimbursed for those manufacturing for export under the Duty VAT Remission scheme.

Labor

Labor is a critical component of the cost structure in the textile industry, particularly in those areas that are labor intensive. Based on Table 7.1, direct labor contributes 10 percent to the cost of production in Uganda and Tanzania. Although the figures for Kenya are aggregate and include indirect labor, discussions with

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[10] Suppliers contacted in Uganda were reluctant to reveal the duty paid. This figure comes from "An Assessment of the Competitiveness of Ugandan Industries", Ministry of Finance and Economic Planning, 1994.

individual textile manufacturers indicate that the proportion contributed by direct labor is between 5 and 10 percent in Kenya. This contribution is generally in line with world standards.

Table 7.4 Monthly Wage Rates in East Africa, December 1993

	KENYA	UGANDA	TANZANIA
Unskilled (per month)	$20-$35	$35-$75	$15-$22
Skilled	$45 -$150	$62.50 - $150	$17-$40
Fringe Benefits (Average)	40%	60%	60%
AVERAGE TOTAL			
Unskilled	$38.50	$88.00	$29.60
Skilled	$136.50	$170.00	$45.60

Sources: The Kenya Export Competitiveness Study, 1994; A Guide to Investing in Uganda, Uganda Investment Authority, 1993; company data on wages

An analysis of the wage rates in Kenya, Uganda, and Tanzania in Table 7.4 highlights the fact tha t wage rates in Uganda were the highest as of December 1993. Due to the appreciation of the Kenya shilling in recent months against the dollar, and new wage rates negotiated by the textile union in Kenya as a result of inflationary trends in 1993, comparative wage rates for unskilled labor are now as high as $95/month inclusive of benefits.[11] These wage rates are considerably lower than a number of major textile producing countries particularly the more developed economies like USA, Hong Kong and South Korea (see Table 7.5). Wage rates in India, Pakistan and China are comparable to those of Kenya and Uganda. This i s particularly threatening since wage rates in Kenya and Uganda have the potential to rise to uncompetitive levels unless productivity rises commensurately. Evidence seems to suggest that currently labo r productivity is higher in Kenya than Uganda.[12] Labor costs should therefore be cheaper in Kenya than in Uganda since wages in Kenya are lower. Although the cost data obtained from the firms was no t sufficiently detailed to determine this definitively, it can generally be deduced that given the same input requirements, the costs of labor in Kenya will be significantly cheaper in Kenya due to the higher wages and lower productivity in Uganda.

In Tanzania, although the wages are cheaper, labor productivity is very low, the lowest in the region. According to firms interviewed, this is partly because of the low wages, but also a direct result of th e incentive structure prevale nt in the socialist system that was predominant in the country for so long. Even though wage rates are low, in comparison to Kenya, significantly more input is required per unit o f production. Depending on the additional level of input required, costs of labor in Tanzania could actually be higher than in Kenya. The cost data presented in Table 7.1 seems to suggest that this is the case.

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[11] The exchange rate used for this calculation was 1US$=43Kshs. Most analysts tend to feel that this rate is overvalued and that in the long term Kenyan currency will depreciate considerably. Although indicative, it would not be accurate to assume that wage rates in Kenya will remain so high in the long term.

[12] Review of Protection Given to Industry in Uganda, Louis Berger International, May 1993.

Table 7.5 Comparative Labor Costs of Textile Industry Operatives in Selected Major Textile Producing Countries

Unskilled Labor Costs Per Person (US$/month)

USA	HONG KONG	S. KOREA	INDIA	PAKISTAN	CHINA
1710	429	505	114	65	70

Source: Journal of the Textile Training Institute, 1991.

Costs of training workers and high turnover also affect total labor costs. In Kenya, there is a reasonably good textile training institute that churns out semiskilled workers for the textile mills. Most mills do not therefore have to have their own extensive in-house training and therefore save on training costs. On the other hand, in Uganda and Tanzania, most workers have to be trained on the job, thus adding to costs. In Uganda in particular, once the workers are trained, a good number leave the firm to set up their own store front enterprises thus adding to the cost of individual firms. Costs for in-house training and higher turnover of workers in Uganda and Tanzania are another possible reason why labor costs are lower in Kenya than in Tanzania and Uganda.

Other factors that affect the productivity of workers and hence overall labor costs include current technology, corporate policy, culture and incentive schemes, training and advancement opportunities. For example, one firm in Kenya introduced a bonus scheme and noticed an increase in productivity in weaving from 73 percent to 85 percent in a period of 5 months. [13] Firm-level policies and these other factors that affect productivity need to be examined in more detail across countries to better identify measures to improve productivity in the region.

Utilities (Electricity, Fuel, and Water) Costs

For the purposes of cross country comparison, utilities include water, electricity, and fuel used in the industrial process. Presented below is a table on the actual costs of these utilities in Kenya, Uganda, and Tanzania (Table 7.6).

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[13]   *Gradual Maturation of an Import Substitution Industry*, Peter Coughlin, 1991. pp. 131.

Table 7.6 Utility Costs in East Africa

	KENYA	UGANDA	TANZANIA
Electricity /Kwh	$0.035	$0.075	$0.073
Water/m^3	$0.56	$0.0014	$0.104
Industrial Fuel/Liter	$0.373	$0.489	$0.353

Sources: The Kenya Export Competitiveness Study, February 1994; Fuel marketing companies in the region, October 1994

Electricity, fuel and water are used extensively in the production process in textile manufacturing. As can be seen in Table 7.1, utilities account for 15 percent of production costs in Uganda, 10 percent in Kenya and 20 percent in Tanzania. The disparities between countries warrant a closer look at the costs of consumption of the various utilities in each country. The price information on utilities in Table 7.6 above highlights the fact that electricity rates for high voltage industrial usage are highest in Uganda and Tanzania. Kenya's rates are twice as low as Uganda's even though Kenya imports electricity from Uganda. This explains partially why the overall utility cost in Kenya, as a percentage of total production costs, is much lower in Kenya than in the other two countries.

A study undertaken to assess the competitiveness of Ugandan industries interviewed eight leading manufacturers in key industries and found out that eighty-eight percent of them rated the cost of electricity in Uganda as either very high or high. [14] A recent article in The Standard substantiated these claims. Investors in Uganda pointed out that the cost of electricity is the highest in the region, and coupled with frequent power cuts, threatened to reduce industrial output and discourage prospective investors. [15] Industries in Tanzania have also complained of high costs of both water and electricity. Power costs in Tanzania increased by between 21 percent and 207 percent between January 1990 and March 1993 and an additional 30 to 87 percent in July 1993. [16]

These high costs coupled with frequent power cuts and low capacity utilization rates, have made it difficult for most industries to operate profitably, as operating costs have tended to rise as a result.

While the cost of electricity is comparatively low, water costs in Kenya are considerably higher than those of the other countries. Part of the problem in Kenya is the general shortage of water, particularly in Nairobi and Mombasa, which tends to push up the price of water in times of high demand. Industries have complained of the problems associated with water rationing and have often resorted to investing in their own boreholes. This however is not an effective long term solution and will hamper industrial growth in Kenya in the long run. The textile industry is particularly affected as water is an important input in the production process. Kenya is not the only country affected by water supply problems. A number of textile mills in Tanzania have been forced to shut down or operate at extremely low capacity utilization levels due

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[14]   *Assessment of Competitiveness of Ugandan Industries, Export Policy Analysis and Development Unit*, Ministry of Finance and Economic Planning, June 1994.

[15]   *The Standard*, October 15,1994

[16]   Measures to Enhance Foreign Exchange Generation from the Textile Industry

to water shortages. Mwanza textiles, for example, has been plagued by water and electricity shortage s throughout the eighties which is reflected in capacity utilization rates as low as 7 percent in 1983 and 11 percent in 1987.

As Table 7.6 indicates, industrial fuel prices [17] are very similar in Kenya and Tanzania, but higher in Uganda. Even when transport costs are removed from the price of fuel in Uganda, the price of fuel is still much higher.[18] Given similar input levels therefore, the cost of fuel in the production process should not differ greatly in Kenya and Tanzania (at least for firms in Dar and Nairobi). In Uganda, however it should contribute slightly more to production costs. In all three countries [19], fuel prices are controlled by th e government and are considerably higher than world prices. In Kenya, taxes in the form of duty and VAT add 37.5 percent to the wholesale price. In Tanzania, excise tax is only 4 percent of the wholesale price, however, overhead costs and margins for the government petroleum corporation (Tanzania Petroleu m Development Corporation TPDC), and costs associated with cross subsidies add an additional 24 percent to the wholesale price. In Uganda, taxes are approximately 40-50 percent of the wholesale price. Thes e costs do not include additional cos ts associated with the refining process and inefficiencies caused by lack of foreign exchange at appropriate times to capitalize on price and foreign currency fluctuations (this is especially the case in Tanzania). There are indications that fuel costs coul d be reduced considerably in these countrie s with more prudent management and eventual liberalization of the industry. This would b e particularly beneficial to Uganda and Tanzania since their utility costs in general are high.

Based on the prices present ed in Table 7.6, overall, utility prices in Tanzania are highest, followed by those in Uganda then Kenya. This seems to tie in with the cost structure presented in Table 7.1. There is thus considerable scope for thes e countries, particularly Uganda and Tanzania to reduce costs for utilities. If Uganda's and Tanzania' s utility costs were to decline to those of Kenya for example, their costs for 200 g of cotton fabric would decline to 1.89 and 2.1 respectively. This is a considerable cost reduction.

Telecommunications

Although not a separate item in the cost structu re presented in Table 7.1, telecommunication facilities play an important role in the industrial process and are part of the overhead costs of a firm. Cost savings as a result of cheap and efficient telecom munications can help boost a country's industrial competitiveness and export potential considerably. An analysis of telecommunication costs in the region shown in Table 7. 7 points out that telecommunication costs are very high in Tanz ania, both for long distance international calls and regional calls. Although costs in Kenya and Uganda are lower, and have come down in recent years, there is still considerable sc ope for further reductions to facilitate competitiveness with international rates that range from US$1.00 to US$3.00 per minute.

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[17]   Prices are for Nairobi, Dar-es-Salaam, and Kampala respectively.

[18]   Using the transport costs from fuel marketing companies, the cost would range from $0.061/liter to $0.010/liter from Mombasa to Kampala, a distance of 1148km. Without fuel costs the price would therefore be $0.389 to $0.428 per liter.

[19]   The petroleum sector was liberalized in October, 1994 in Kenya. For the purposes of this analysis the industry was still controlled, however it should be expected that the pricing structure should become increasingly competitive in Kenya vis a vis the other countries as a result of liberalization.

Table 7.7 Telecommunications Costs to Various Destinations

RATE (PER MINUTE)	KENYA	UGANDA	TANZANIA
USA	$3.36	$4.30	$6.63
PTA Region (Average)	$1.64	$1.61	$5.52

Source: Telephone companies in the region

Cost of Capital

Although not specifically included in the cost of production analysis in Table 7.1, capital costs play a significant role in costs of production, particularly in the East African region. Discussions wit h manufacturers, seems to suggest strongly that after raw materi al costs, capital costs are the most significant costs in the production process. Recent data on costs of capital was only available for Uganda. If costs of capital are included, the cost to manufacturing fabric x 200 grams shoots up to $3.56 from $2.17, a 7 6 percent increase! In the case of this particular firm, it had obtained a loan from the World Bank in th e 1980s when the excha nge rate was overvalued. With the periodic devaluation of the Uganda shilling over the years, coupled with high interest rate s, it has become extremely difficult and costly to service the loan.

The situation is the same for a number of firms in both Tanzania and Kenya. The case of Musom a Textile Mill in Tanzania is indicative of the problems faced by a number of mills in the region. Presented in Table 7.8 below is the cost structure for Musoma in the 1980s. The cost of finance jumped from 3 7 percent to 330 percent between 1983 and 1986 largely as a result of the depreciation of the currency during that period. Depreciation costs also rose for the same reason. As a result, the firm faced severe problems evidenced by its low capacity utilization averaging 13 percent in the 1984 - 1986 period.

Table 7.8 Musoma Cost Structure (% Value of Production)

	1983	1986
Cotton	30%	16%
Energy	7%	10%
Wages and salaries	7%	15%
Depreciation	29%	238%
Overheads	46%	77%
Financial Costs	37%	330%

Source: Texco

Like Musoma, the firms that experienced major difficulties in all three countries were those that had foreign denominated loans. The majority of these were publicly owned (either partially or wholly) mills.

Private mills also suffered as it is difficult to obtain loan f inancing for textile operations. High interest rates have also contributed considerably to the cost of capital. As Table 7.9 indicates, average lending rate s between 1991 and 1993 in the reg ion have ranged from 25 percent in Tanzania to 30.1 percent in Uganda. These are lending rates to agriculture since data was not available on lending rates to industry for all years. Generally however, lending rates to industry are higher and one can safely assume that most textil e manufacturers are faced with interest rates above 30 percent. This is very high given the low capacit y utilization in general and the increasing competition from imports that face much less severe financia l costs.

Table 7.9 Nominal Lending Rates; 1991, 1992, 1993 [1]

	KENYA	UGANDA	TANZANIA
1991	19.7%	37%	20-31%
1992	26.9%	33%	18-31%
1993	36.8%	20.3%	20-30%
Average	27.8%	30.1%	25%

Source: Kenya: Economic Survey 1994; Uganda: Background to the Budget, 1994-95; Tanzania: Bank of Tanzania, 1992; Kenya Export Competitiveness Study, 1994

Taxes

Another significant contributor to production of costs is taxes. It was not possible to obtain actual tax data from firms. However it is still possible to estimate the tax contribution in each country using the cos t structure outlined in Table 7.1 . Taxes levied on industry come implicitly through import duties and excise taxes and explicitly through taxes on profits. The share of implicit tax largely depends on the share o f imports in total production costs. Using the cost data in Table 7.1, the import content for Uganda ranges between 14 and 20 percent, the import share f or Kenya ranges between 52 and 60 percent, and between 29 and 35 percent in Tanzania. [20]

Given the high import dependency in Kenya, one would expect in Kenya that the tax paid in the form of duty would be highest in Kenya. Table 7.10 below highlights the duty structure on imports in the three countries.

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[20]   It is assumed for this calculation that all cotton in Kenya is imported. The share of import content would be slightly higher in Tanzania and Uganda if imported synthetics were included. The share would also be higher in all three countries if imported spare parts and machinery were included.

Table 7.10 Taxes Levied on Imports

	KENYA	UGANDA	TANZANIA
Cotton	5%	—	—
Dyes and Chemicals	38% (duty and VAT)	10%	10%
Fuel	37.5%	50-57%	28%
% of COP	7.68	3.43	4.98

As predicted, taxes as a percentage of production costs are highest in Kenya at 7.68 percent followed by Tanzania and then Uganda. It is important to note however, that Kenyan exporters can obtain remission on duty and VAT. Local manufacturers can offset VAT paid for imports against VAT owed them by their distributors. Ultimately, however, the tax contributes to higher prices for the consumer.

As a percentage of costs of production, taxes paid on imports seem relatively insignificant. As a percentage of profits, the proportion of tax paid is much larger. Table 7.11 highlights both implicit an d explicit tax contribution assuming profit levels of 30 percent of costs of production.

Table 7.11 Taxes as a Percentage of Profits in East Africa

	KENYA	UGANDA	TANZANIA
Duty (% of profits)	19.2	8.5	12.45
Tax on Profits (%)	35.0	30.0	35.0
Total Tax (% of profits)	60.6	41.4	47.45

Assuming a profit level of 30 percent of costs of production, the total tax burden would range from 41.4 percent in Uganda to 60.6 percent in Kenya. Although these figures are estimates they give a goo d indication of the tax burden faced by manufacturers in the region. This tax burden has created an implicit bias in favor of imported textiles. For example, in Tanzania, although local manufacturers share of th e domestic market is only 10 percent they paid Tshs 4 billion in sales tax between 1990 and 1993 whil e importers paid only 64 million in the same period. [21] The situation is similar in Uganda and Kenya as textile firms grapple with stiff competition from imports that often are undervalued and under taxed. The result has been a general decline in capacity utilization for those firms that are unable to reduce costs, or shift production to more lucrative product lines.

CONCLUSIONS

There are a number of areas that should be examined further by each country to facilitate cost reductions and enhance industrial competitiveness in the region. Regarding cotton, all three countries will need t o ensure that the industry is well managed and tha t farmers receive adequate incentives and research support

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[21]   Measures to enhance foreign exchange generation from the textile industry in Tanzania.

from the government. Kenya in particular has allowed its cotton sector to deteriorate considerably and as a result most firms are importing cotton from other countries in the region. The high cost of importin g cotton could adversely affec t the competitiveness of the textile industry particularly exporters. In fact, the recent appreciation of the currency has made it impossible for exporters of yarn to export since the price of finished yarn in their export destinations is higher than the price of unprocessed cotton in Kenya.

For other inputs such as dyes and chemicals it was not ed that Tanzania appears to spend comparatively more, at least for the particular firm analyzed. It is necessary however to do a more extensive analysis of prices and input levels for dyes and chemicals in the region to determine definitively whether this is the case.

Labor costs are generally competitive in all three countries, although there is the potential for labo r rates in Kenya and Uganda to escalate to uncompetitive levels if productivit y does not rise commensurately. Measures will need to be put in place to enhance productivity. One area of need is a training facility for textile workers in Uganda and Tanzania. Due to the present low level of capacity utilization in thes e countries, setting one up from scratch may not be financially feasible or practical. This should be a long term plan for both countries. In the short term, given the new spirit of regional cooperation, discussions should be held to allow workers to attend the training institute in Kenya.

Utility costs are higher in Uganda and Tanzania than in Kenya. Electricity costs are particularly high in Uganda and Tanzania and frequent power cuts have affected production ef ficiency and costs. Water costs are highest in Kenya and will ne ed to be reduced in the long term through the provision of adequate water in key industrial areas. The cost of industrial fuel in Uganda is highest even after factoring in transpor t costs. The Government of Uganda may eventually have to do a thorough analysis of the petroleum sector and identify ways to reduce the cost of fuel while at the same time catering to its revenue needs.

Capital is a critical constraint in the region in general. Interest rates have been high historically an d many firms are burdened with high foreign debt payments. Constructive steps will need to be taken t o reduce the financial burden of key government textile mills that may be attractive for privatization. This has already begun in Uganda and Kenya and although the government in Tanzania has indicated it s intention to private textile firms progress has still been very slow to the detriment of the industry. Sound macroeconomic management will also help to bring down inflation and allow interest rates to settle a t levels conducive for industrial borrowing.

Taxes on industry in the region are g enerally high, although they have been reduced substantially over the past few years. There is a need for the governments in the regio n to reexamine their tax policy to ensure against an import bias. A critical issue here is **enforcement** of the duties levied on imports.

POLICY IMPLICATIONS

Based on the analysis presented, there are a number of policy implications for governments and donor s interested in interventions in the region. Presented below are some potential areas for future intervention that will help to enhance industria l competitiveness in the region. A lot of the recommendations given can be applied to all three countries although some are more specific to individual countries.

Cotton

Expand and improve research facilities in the region. Revitalizing and maintaining a thriving cotto n industry is an important component of regional comparative advantage in textile manufacturing. B y liberalizing the industry in Uganda and Kenya, it is expected that private investment and free access t o markets will provide sufficient incentives to the farmers and ensure higher quality ginning. There is still

a need however to improve the research capabilities in all three countries to ensure that the cotton varieties that are grown are suitable for the particular agroeconomic zones in the region. Research should b e coordinated in the region to take advantage of discoveries in other countries. Donors should conside r funding a regional research prog ram for the countries in the region in collaboration with governments and research bodies already conducting research.

Labor Productivity

Set up a regional training institute to provide training to unskilled and semiskilled workers on all aspects of the textile industry. Kenya already has a reasonably good textile training institute (Kenya Textil e Training Institute) which could be upgraded to train textile personnel in the region. It is understood that UNIDO has already selected Kenya as a potential host country for texti le training throughout the PTA. This activated should therefore be pursued vigorousl y by the East African countries and potential donors so that workers can begin to be trained as soon as possible.

Conduct a detailed analysis of ways to improve productivity in the region. One of biggest difference s between workers in As ia and in the East African region is their productivity. The experience of these and other countries like the U.S. should be examined in the context of i mproving productivity in the region. The experience of other successful and unsuccessful firms in the region should also be examined to facilitate the analysis and share and expand knowledge on ways to improve productivity in the region.

Infrastructure

The problems of infrastructure ar e well known to both governments and donors alike. There are a number of projects already in place funded by the World Bank and other donors to improve infrastructure in the region. The recommendations presented bel ow are made only to highlight areas of specific and immediate need that have been identified as part of this analysis.

Electricity

Improvements need to be made in a ll three countries to reduce costs. One area that should be examined in more detail is revenue collection. In Uganda for example all the revenue collected in 1993 was only 2 4 percent of the total amount due. If collection was more efficient, the tariffs would not need to be as high as they currently are. Commercialization of operations in these public corporations would enhance th e revenue collection efficiency and cost structure considerably.

Water

Action needs to be taken to reduce the water shortage problems experienced by firms in the region , particularly in Tanzania and Kenya. The World Bank is already involved in this to a certain extent, bu t implementatio n, particularly in Kenya, is taking longer than was projected and is an area of concern t o potential investors.

Fuel

A detailed analysis of fuel costs in each coun try should be taken to identify efficiency enhancing measures that would reduce fuel costs in the region. The analysis should cover all aspects of the distribution chain from refinery costs to marketing costs to administrative overhead and taxes. It should also include a n analysis of the cost implications of liberalization of the petroleum sector.

Telecommunications

Facilitate continued investment and moder nization of telecommunications in the region. Governments and donors in the region are all aware of the importance of im proving telecommunications facilities. Continued support by donors in thi s area and commitment by governments in the region to enhance the efficiency of

services through commercialization and privatization is essential if telecommunication costs are to b e reduced in the long term.

Costs of Capital

Expedite full liberalization of the financial sector in the region. Access to low cost capital is a critical factor in efforts to revitalize the textile industry and industry in general in East Africa. Continued support for sound macroeconomic management and liberalization of th e capital markets will improve access to and the cost of financing. Linking capital markets in East Africa would also help to improve access to financing for industry and improve efficiency of the markets. A detailed analysis of the potential costs and benefits of regional financial integration should be done so that a realistic timetable for all three countries can be developed.

Seek innovative ways to privatize textile mills. A number of textile mills in the region have bee n unattractive to local or foreign investors because of their large debts, old equipment and in many cases , weak management. This is particularly the case in Tanzania. The governments in the region may have to consider assuming the debt themselves or develop innovative capital restructuring mechanisms like debt /equity swaps to make the purchase of these mills viable options.

Taxes

Review the current tax systems in the region. This will help to avoid a bias towards imports vis-a-vis the domestic textile industry. In Tanzania, it is important to harmonize the tax system between Tanzania and the mainland Zanzibar to avoid the spillover of untaxed or under taxed goods from Zanzibar to th e mainland. In all three countries, appropriate enforcement measures are necessary at customs to ensure that the adequate duty and excise taxes are paid.

Backward Linkages

Support the development of cottage industry in the region. The cottage industry in the region has a lot of scope for development so that it can service l arger industry with appropriate, high quality inputs. In Kenya for example, there are a number of women's groups that are manufacturing dy es from plants, barks of trees, stones and clays. These groups an d others should be supported to facilitate the commercialization of these dyes. In the same vein, support to th e small scale metal/foundry sector will help to develop the indigenous capacity to manufacture and repair machinery.

8. Analysis of Competitiveness and Comparative Advantage

Maize, Beans, Coffee, and Textiles

INTRODUCTION

With the on-going structural adjustment pr ograms and trade liberalization policies currently being pursued by the three East African countries, there is a need to analyze the econom ics of production not only at farm-level but also in the wider context of their competitiveness and profitability in both the regional and world market. Furthermore, the geog raphic proximity of the three contiguous countries and their membership in such regional trade arrangements as the Preferential Trade Area (PTA) and the anticipated new Eas t African Community (EAC) offer great opportunities for exploiting trade in both traditional and non - traditional crops. It is worth noting that the informal market traders are already taking advantage o f crossborder trade opportunities in the maize and beans markets (Odhiambo, 1994).

The comparative cost of production analysi s alone cannot reveal the competitiveness of each country's individual commodity in the regional or the world market. Both supply and demand factors influence the competitiveness of a given commodity in the world or regional market. On the supply side, these factors include:

- Cost of production

- Marketing costs

- Quality (and sometimes reputation for level of quality)

- Product differentiation (e.g. being identified as Kenyan coffee, not just as coffee)

- Resource base (land, capital, labor availability, productivity, and prices or costs).

- Macroeconomic policies, both m onetary (e.g. exchange rate) and fiscal (taxes and subsidies); sectoral or commodity-specific policies; trade policies (e.g. import tariffs, export subsidies)

- Technological development (R&D); varietal as well as packaging, proces sing, and grading technologies

- Diffusion of technology (i.e. extension)

- Infrastructure, especially marketing infrastructure (e.g. transportation and marketing facilities)

- Dissemination of market information

  On the demand side, important factors influencing competitiveness are:

- Developments in world or regional commodity markets

- Market shares

- Market structure

- Overall demand and changes in tastes and preferences particularly demand factors in target markets

- Relative resource endowments and factor prices and productivity in competing producing countries

- Policies in competitive producing countries

- Technology/development of new substitutes

- Tastes and preferences

- Population growth

- Income growth in domestic and foreign markets

MEASURING COMPETITIVENESS

Cost of Production

A farmer's profits from growing a given crop depend upon the price he receives for his output, the level of output he is able to produce, and the costs he incurs in producing it. One way of judging competitiveness is to compare those production c osts across countries. A comparative cost of production analysis was thus undertaken as the first step in this study. To a large extent, this comparative cost of production analysis is fairly indicative of further issues of comparative advantage. This is because in recent years in all thre e countries, policy distortions have decreased significantly following SAPs and market liberalization in the region.

The second step is to extend the analysis to examine comparative advantage issues. This was don e using existing DRC analyses (described below) where available, as well as our own calculations of DRC ratios using the COP data already analyzed as the basis for the comparative advantage calculations .

Domestic Resource Costs

Domestic resource costs (DRCs) are calculated to measure the degree of comparative advantage that   a particular production activity gives a country. The DRC ratio is calculated as the ratio between the value added to primary or nontradable factors of production and the value added to tradable factors. [22] Primary factors include those inputs that are not usually traded internationally, such as land, labor, water, an d capital. Tradables are goods that are or could be traded intern ationally, including fuel, machinery, chemical fertilizers and pesticides, and spare parts.

DRCs > 1 indicate an inefficient use of resources, since the value of domestic resources used i n production exceeds the value of foreign exchange earned (in the case of export crops) or saved (in the case of import-substitution crops). In such cases, the country does not have a comparative advantage i n production.

DRC analysis begins with the development of a crop budget for each production alternative bein g compared (and where relevant, includes production systems using different techniques, e.g. hand-tool vs.

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[22]   DRC = net cost (value) of nontradable factors/value of production (revenues) - cost of tradable inputs.

animal traction). The determination of profit actually received by farmers (i.e. financial profitability) is a straightforward and important initial result of the analysis. It shows which farmers are competitiv e currently and how their profits might change if price policies were changed.

Beyond financial profitability is the issue of economic efficiency or comparative advantage of th e commodity system. One of the ad vantages of the DRC methodology is that it requires opportunity costing of primary factors of production: land, labor, and capital. The opportunity cost of inputs and outputs in the production process are represe nted by economic or shadow prices (also called social prices). These prices are intended to reflect the true economic value of goods and services in the absence of government policies such as taxes, subsidies, import tariffs, quotas, and price controls. When output, inputs, and factors o f production are valued at their shadow prices, the profitability figure calculated is said to be that o f *economic* profitability, reflecting the real economic returns to a given production activity, as opposed to financial returns.

Comparative Advantage Versus Export Competitiveness

The terms "comparative advantage" and "export competitiveness" are confusing to many and should b e clarified here. The term "comparative advantage" is global in perspective, used for country analysis and concerned mainly with economic analysis.[23] The term "export competitiveness", on the other hand, i s restricted to financial analysis at market prices to determine the competitiveness of tradables in terms of their financial profitability to exporters. To an exporter, the competitiveness of a tradable depends on his financial gain from a trade activity. Unless it is financially profitable, a commodity is not competitive to export. An exporter is also interested to know how much financial cost he has to incur to earn a unit o f foreign exchange. The domestic resource cost analysis can be used at market prices to measure th e competitiveness of exports. A commodity has a competitive advantage when at prevailing market prices its DRC is equal to or lower than the prevailing official exc hange rate. However, because policy distortions have declined considerably over the last few years in all 3 countries, this financial analysis is felt to be a strong indication of comparative advantage.

The sections that follow provide analysis of the competitiveness and comparative advantage of each of the three countries in the pr oduction and marketing of the crops in terms of East African (regional) and World markets.

COMPETITIVENESS AND COMPARATIVE ADVANTAGE OF MAIZE IN EAST AFRICA

The detailed analysis of competitiveness and comparative advantage of maize in the three countries ar e given in Table 8.1 and Appendix 6 of this report. From the tables it can be seen that the Kenyan large scale sector has no comparative advantage in maize production both in the regional and the world market. It is only in the local Nairobi market that the Kenyan maize from that sector shows some comparativ e advantage with a financial DRC ratio of 0.52. The corresponding DRC ratios are 1.72 for the Kampal a market; 1.27 for the Dar es Salaam market and 12.45 for the world market. Smallholder maize in Kenya however, is found to be competitive in the world and all three regional markets of Nairobi (DRC ratio = 0.48), Kampala (DRC = 0.53) and Dar-es-Salaam (DRC=0.68). However, smallholder production in Kenya is largely subsistence based, and the little surplus realized is generally sold locally with insignifican t

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[23] For example, just because country X can export crop Y competitively in world markets doesn't mean they have a comparative advantage in producing that crop for export. They may be heavily subsidizing the production of that crop, and the cost of those subsidies to the country must be taken into account before we can say they have a comparative advantage.

amounts left for export. It is the large sc ale producers who have adequate surplus for export in good years, although according to this study they seem to have no comparative advantage.

Indeed, a recent study reported that following the full liberalization of the maize marketing system in 1993, Kenyan large scale maize millers have been finding it cheaper to import maize from South Africa and Argentina instead of sourcing their supplies from the local market (Odhiambo, 1994). Local maiz e farmers, unable to sell their maize, have launched a series of complaints to the Kenyan Government i n order to get protection from the cheap maize imports. By August 1994, the situation became so bad that the Kenyan Minister for Agriculture felt it necessary to impose a ban on maize imports as a protectio n measure for the local maize farmers. The ban was later lifted but replaced by a variable import duty levy on cheap cereal imports including maize.

The variable duty levy on cereals dates back to 1992 when the Government of Kenya (GOK) full y liberalized grain imports under i ts Cereals Sector Reform Program (CSRP) and the Structural Adjustment Programs. At that time a legal clause was gazetted imposing the levy as a protection for local producers against cheap imported grains like maize, wheat and rice. Howeve r, as of September 1994 the levy had still not been implemented. Finally in 1994 it was implemented replacing the total ban initially adopted t o protect the farmer. The va riable duty levy is calculated as the difference between the local producer price of a given grain and its import parity price. The duty is to be charged if the local producer price is greater than the import parity price for a given grain consignment. Only grains coming into Kenya as donations or for famine relief aid are exempted from the duty.

The comparative advantage analysis for Ugandan maize (see Table 8.1 and Appendix 6) shows that it is only competitive in the Kenyan (Nairobi) market (DRC ratio = 0.88). Ugandan maize is no t competitive and by implication has no comparative advantage in the world market and other regiona l markets of Dar es Salaam and (surprisingly) Kampala. The financial DRC ratios are 1.51 and 1.97 for the in-country and regional markets of Kampala and Dar es Salaam respectively, and 17.15 for the worl d market.

A close look at the results given in the tables in Appendix 6 shows that Uganda's low maize yield s make production of the commo dity expensive. The off-farm and marketing costs are also more expensive because Uganda is land locked and most of the produce has to be moved primarily by road transport t o regional and world markets.

During 1993 and 1994, the World Food Program (WFP) has been the major buyer of Ugandan maize for relief supplies to war-torn neighboring cou ntries such as Rwanda, Sudan and Somalia. The WFP offers prices 5-10 percent above the Kampala market price as long as that price is below the international price CIF Kampala (Sekabembe, 1994). Some of the strategies that have been recommended to Ugandan fo r capturing the Kenyan market include:

- Making the maize cheaper by achieving higher yields through better crop husbandry.

- Developing a maize trading center in the Eastern border towns of Uganda, closer to Kenya so tha t transportation costs to Kenya can be reduced.

- Using cheaper modes of transport like the railways instead of road transportation; and

- Seeking bilateral arrangements through EAC or PTA to have Uganda maize imports to Keny a exempted from the variable duty levy.

The results obtained in this study somehow corroborate the findings of the 1993 Bank of Ugand a Agricultural Secretariat study which conc luded that Ugandan maize did not have a comparative advantage

in the World market but had some compa rative advantage in the regional market (Bank of Uganda, 1993). In the study, the DRC ratio f or Ugandan maize in world markets was 5.63 and for the regional market the DRC ratio was 0.67.

Our financial DRC analysis shows tha t in the case of Tanzania, maize has a comparative advantage in both the world and regional market with the exception of the K ampala market (see Table 8.1 and Appendix 6). The DRC ratios are 0.64 for the world market and 0.50 and 0.68 for the Nairobi and Dar es Salaa m regional markets respectively. The DRC ratio obtained for the Kampala market is 1.07.

According to an earlier study (Shetty, *et al*, 1992) a financial DRC a nalysis found that Tanzanian maize was competitive in the in-country market of Dar es Salaam (DRC ratio = 0.95), the border export market (DRC ratio = 0.37) and the world market (DRC ratio = 0.93). It should be pointed out that the border export market referred to in this earlier study does not imply the borders between Tanzania and her sister states of Uganda and Kenya, but rather to that of Zambia, Malawi and Burundi. However, one thing that comes out clearly is that the Tanzanian maize is more competitive in both the regional and world market than the maize from Kenya and Uganda.

Table 8.1 Summary of Competitive and Comparative Advantage Analysis for Maize in East Africa

| | NAIROBI | | KAMPALA | | DAR ES SALAAM | | WORLD | |
	DRC Ratio	Rank	DRC Ratio	Rank	DRC Ratio	Rank	DRC Ratio	Rank
Kenya (a)	0.48	3	1.72	4	1.27	3	12.45	3
Kenya (b)	0.88	1	0.53	1	0.62	1	0.83	2
Uganda	0.50	4	1.51	3	1.97	4	17.15	4
Tanzania	0.52	2	1.07	2	0.68	2	0.64	1

Source: Appendix 6 Tables

Ranking: 1 — most competitive; 3 — least competitive

For Kenya, (a) refers to large scale farms, (b) refers to smallholders

COMPETITIVENESS AND COMPARATIVE ADVANTAGE FOR BEANS IN EAST AFRICA

The competitiveness and comp arative advantage of beans as a potential nontraditional export crop in East Africa is summarized in Table 8.2 and detai led in Appendix 6 of this report. For Kenyan beans, the results show that the crop is competitive in the world market (DRC ratio = 0.47) and all three regional markets of Nairobi (DRC ratio = 0.36), Dar-es-Salaam (DRC ratio = 0.39), and Kampala (DRC ratio = 0.68).

Although the results show that Kenya has some competitive advantage in bean exports, it should be pointed out that local demand still outstrips domestic supply. Indeed, in the last 3 years when Keny a experienced food shortages, the GOK has effectively banned food exports especially those of maize and beans. Kenya should therefore be regarded as a potential market for beans coming from her neighbors in the region, especially Uganda and Tanzania. R ecent studies indicate that just like maize, there is a thriving

crossborder trade in beans with much of the net trade flow coming into Kenya from both Uganda an d Tanzania (Ouedraogo *et al.,* 1994; Kodhek 1993).

Table 8.2 in this section and Table A6.4 in Appendix 6 show that Uganda has no comparativ e advantage in beans exports, bo th regionally and in the World market. The calculated financial DRC ratios are all above 1.0. Specifically, the DRC ratio is 4.88 for Ugandan beans exported to the regional market of Nairobi. The corresponding DRC ratios for Kampala and Dar es Salaam are 1.44 and 1.07 respectively, while that for the World market is 1.41. Any attempt to export Ugandan beans must first and foremos t begin by improving yields at the farm-level w hich in turn will lower production costs. The second strategy would be to lower transportation and marketing costs.

A 1992 Bank of Uganda study on the economic analysis of comparative advantage of beans found that the crop had a marginal comparative advantage in th e export market, with a DRC ratio of 0.95. Indeed, the study found that Uganda had a strong comparative advantage in virtually all food crops. The results in the current study could be biased due to the fact that it is mainly based on financial rather than economi c comparative advantage ana lysis due to scarcity of data. The differences in the results could also be due to the fact that the current study is based on 1993 data while Bank of Uganda study used 1992 data.

As for Tanzania, the results in the present st udy show that beans from that country have a comparative advantage in all the export markets analyzed. The DRC ratios obtained for the regional markets are 0.13 for Nairobi market, 0.30 for Kampala market, 0.17 for Dar es Salaam market and 0.11 for the Worl d market (see Appendix 6). These results conform to some extent with those of Shetty *et al*. (1992) which found Tanzanian beans competitive in the export market with a DRC ratio of 0.47.

Table 8.2 Summary of Competitive and Comparative Advantage Analysis for Beans in East Africa

| | NAIROBI | | KAMPALA | | DAR ES SALAAM | | WORLD | |
	DRC Ratio	Rank	DRC Ratio	Rank	DRC Ratio	Rank	DRC Ratio	Rank
Kenya	0.36	2	0.68	2	0.39	2	0.47	2
Uganda	4.88	3	1.44	3	0.39	3	1.41	3
Tanzania	0.13	1	0.30	1	0.17	1	0.11	1

Source: Appendix 6 Tables

Ranking: 1 — most competitive; 3 — least competitive

CONCLUSIONS AND RECOMMENDATIONS FOR MAIZE AND BEANS

The analysis shows that Tanzania has a compar ative advantage (i.e. DRC <1) in both maize and beans and can export them competitively to both regional and world markets. Somewhat surprisingly, the DR C analysis shows Tanzania out-performing both Uganda and Kenya in both these crops. This confirms the results of the COP analysis, which showed that Tanzanian farmers have the lowest per kilo cost o f production for beans and maize, although it should be noted that these were under medium to high-input assumptions for the region of Arusha. Once again, more actual farm budget data for Tanzania is needed to make more conclusive statements re garding how accurate the input and yield assumptions (and thus the COP and DRC estimates) are.

Kenya, on the other hand, has no comparative advantage in maize, but does have one in beans to Dar es Salaam and the world market. However, given that Kenyan farmers have not been able to satisf y domestic demand for maize and bea ns, it makes more sense for them to sell the beans in the home market in Nairobi (with a low DRC ratio of .36) and other Kenyan towns than to try to go for the more costl y export market. Policy initiatives should therefore be directed towards increasing production for the local market instead of aiming at increasing exports.

The analysis has shown that Uganda has no comparative advantag e in the production of both maize and beans for the world market. However, the analysis for the regional market shows that Uganda has a comparative advantage selling her maize to Kenya i n the Nairobi market. Other studies have indicated that Uganda does have a comparative advantage pro ducing maize and beans for the regional market. However, Ugandan maize and beans must be produced and marketed more cheaply than they are at the moment , where maize from either S. Africa or Argentina reach Kenya at lower CIF prices than shipments fro m Uganda. Currently, the World Food Program (WFP) and other relief agencies are providing a ready market for Uganda's maize and beans market. As noted already, the WFP offers 5-10 percent above loca l (Kampala) prices provided such prices are below world prices CIF Kampala. The market provided by the relief agencies should be regarded as temporary since it depends on the duration of the civil wars an d disruptions of peace in the neighboring countries of Rwanda, Burundi, Sudan and Somali. Long term export production plans must be based in other conventional regional and world markets.

COMPARATIVE ADVANTAGE/COMPETITIVENESS OF COFFEE IN EAST AFRICA

The World Bank recently sponsored comparative advantage studies as part of their Agricultural Secto r Reviews of Uganda and Tanzania. A summary of these DRC analyses is found in Table 8.3.

Table 8.3 Comparative Advantage of Tanzanian and Ugandan Arabica Coffee — 1992 ($/kg)

OUTPUT	UGANDA	Economic		TANZANIA	Economic	
	Financial	Foreign	Local	Financial	Foreign	Local
Export Price ($/kg)	1.81			1.50		
Exchange Rate (Shs/$)	900			325		
OFF-FARM COSTS						
Processing Costs	.20	.03	.17	.27	.13	.14
Marketing Costs	.19	.11	.08	.27	.13	.14
Collection Costs	.03	0	.03	.009	0	.009
Total Off-Farm Costs	.42	.14	.28	.55	.27	.28
ON-FARM COSTS						
Fertilizers	.09	.06	.03	.31	.25	.06
Hired Labor	.10	0	.10	.19	0	.19
Transport/Others	.008	0	.008	.01	.005	.005
Family Labor	.34	0	.34	.46	0	.46
Fixed Costs	.08	.04	.04	.11	.05	.06
Total On-Farm Costs	.61	.10	.51	1.08	.31	.77
TOTAL COSTS	1.04	.25	.79	1.63	.58	1.05
Net Output Value	.77	1.56	—	-.14	.92	
DRC Ratio	.71	.53		1.15	.66	

Sources: Bank of Uganda, 1993; World Bank, Tanzania Agricultural Sector Memorandum, 1993.

The DRC ratio, measured at market prices, can be used to measure financial competitive advantage, since to an exporter, the actual financial cost incurred fo r an export and the actual financial benefit realized in local currency (and the ratio between the two) d etermines the comparative advantage of the commodity. This ratio thus provides a measure of financial competitiveness. It is com puted using the DRC ratio formula at market prices and the of ficial exchange rate. For Tanzanian Arabica coffee the financial DRC measure was 1.15 in 1992, indicating coffee was not financially profitable to export in 1992 (i.e. the domesti c financial costs incurred to earn a dollar from cof fee exports exceeded the official exchange rate at the time of 325 TShs/$1).

However, the economic analysis (i.e. looking a t it from the point of view of the economy) still showed Tanzania had a comparative advantage in exports (i.e. DRC < 1). In ot her words, a simple move away from the overvalued official exchange rate (the most distorting policy) would make coffee exports profitabl e again. Indeed, this appears to be what has happened in Tanzania in recent years. Several positive policy changes have occurred, boosting farmer incentives to produce more high quality coffee:

- abolishment of the official exchange rate and 50 percent devaluation that followed.

- abolishment in 1992 of the pooling system, resulting in TCMB paying the proceeds of the auctions to Unions within 3 weeks (who in turn must pay the Primary Cooperatives who pay the farmers)

- after 1993, the Government stopped announcing the advance payment to made by Unions to farmers (which had previously caused high Union debts)

- since March 1993, chemical inputs have been marketed by the private sector.

- exporters can retain 10 percent of their earnings in foreign currency (this may be higher now).

The World Bank has been pursuing further liberalization measures with the Government of Tanzania that will address the issues of further streamlining the processing and marketing of coffee (e.g. allowing the private sector to purchase coffee directly from the farmers, and privatizing the curing companies and mills). If implemented properly, these policy changes should lead to lower processing and marketing costs, thereby increasing the competitiveness of Tanzania coffee further.

The financial analysis for Uganda showed tha t coffee was financially profitable to export, with a DRC ratio of less than one (.71). However, from a financial profitability point of view, the nontraditional export crops vanilla, mulberry silk, cardamon, tobacco, chilies and cashew nuts all ranked higher than coffee in 1992 (and 1993). With the recent high world price for coffee, this changed dramatically in 1994 whe n profits increased to 5 times the 1993 levels (Bank of Uganda, Nov. 1994).

The economic analysis found that Uganda had a relatively strong comparative advantage in coffe e exports, with an economic DRC ratio of .66. It is informative to note that in previous years, comparative advantage analyses for Ugandan coffee found that it did not enjoy a compara tive advantage, largely because of an overvalued official exchange rate. With the removal of this policy distortion (coffee was brough t under a market exchange rate in 1992), Uganda has become more competitive in coffee. The 1993 study also measured the degree of policy distortions affecting input and output prices, and found that unlik e previous years when policy distortions created negative incentives, Ugandan farmers and exporters faced positive incentives to produce coffee [24].

In the case of Kenya, no formal 1993 DRC analysis exists for a direct comparison with the Uganda and Tanzania data. However, it is interesting to look at what is happening currently in the world coffee market, and how it may impact o n Kenya's coffee farmers. Since 1993, world coffee prices have been on the rise, peaking at $5000/ton for Arabica coffee in mid-1994 from a low point of $1500/ton in 1989. They have recently fallen back down to levels of around $4000/ton.

- Assume a world price of $4000/ton ($4/kg, or $1.77/lb.): this is the equivalent of 180 Shs/kg at a n exchange rate of 45 KShs/$1.

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[24]   The more recent Bank of Uganda comparative advantage analysis (June 1994, although the report was not available until Nov. 1994) shows coffee now has a strong comparative advantage, with a DRC ratio of .22.

- Subtract international transport costs to Mombasa of 10 Shs/kg (adjusted from rates calculated i n Kristjanson et al., 1990), to arrive at a f.o.b. Mombasa equivalent pric e of 170 Shs/kg; subtract 6 Shs/kg for Mombasa — Nairobi transport charges (CMB, personal communication), to get a Nairobi price of 164 Shs/kg.

- Kenyan smallholders receive on average 70 percent of the world price, therefore, currently Kenya n farmers should be receiving 115 Shs/kg for their coffee. L ast year, according to the PAM budgets, they received from 19 - 28 Shs/kg. In othe r words, farmers should currently be receiving a price four times higher than the price they received last year.

- According to the CMB, the current average auction price in Nairobi is $4/kg. The CMB calculates on average the milling/CMB charges are 10 percent of the auction price and the cooperative societ y charges range from an additional 7 to 30 percent, and ave rage around 20 percent. Deducting 30 percent from $4/kg implies a farm-level price of 140 Shs/kg (at an exchange rate of $1=45 KShs).

The positive response by Kenyan coffee farmers to better price incentives (and timely payments due to the new direct sales system) is being seen now through a sharp increase in demand for coffee seedlings. The CMB is now under attack for not being able to supply sufficient seedlings. There is an 18-24 month time lag after prices rise before an increase of cherry coffee will be seen in the market, however . Liberalization of the input market is currently benefitting farmers, however, who are now facing no input availability problems as they did in the past [25].

CONCLUSIONS AND RECOMMENDATIONS FOR COFFEE

It is clear from the analysis that all three countries have a comparative advantage in coffee, with DRC's below one at a time when the world price of coffee was still very low. Currently, they are all extremely competitive in world markets, where demand is outstripping supply and quotas are no longer in place for the time being. It is also clear that they could all be even mo re competitive through reductions in marketing and processing costs (particularly by inefficient cooperatives), and better husbandry practices. Mos t smallholders have, until recently, applied very low amoun ts of recommended fertilizers and pesticides, and are consequently getting extremely low yields. Policy liberalization has l ed to improved incentives to coffee farmers via an increase in the percentage of the world price they are receiving.

COMPARATIVE ADVANTAGE/COMPETITIVENESS OF TEXTILES IN EAST AFRICA

The comparative advantage analysis for textiles relied primarily on the direct cost methodology. Due to the extensive data collection requirements of the DRC approach, it was not possible to do a comprehensive DRC analysis for the countries under this study. DRC analysis has been done previously, however, i n Uganda, Kenya and Rwanda, and will be used to complement the analysis performed under the direct cost approach. The analysis will attempt to highlight areas of specific comparative advantage for the countries in the region and where relevant, the region as a whole.

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[25] Last year, lack of availability of foreign currency coupled with a duty on imported chemicals meant many farmers and cooperatives could not get the chemical inputs they desired. There is no longer a duty on these inputs, foreign exchange is readily available, and farmers can purchase inputs from private traders. All these policy changes have increased the availability of inputs, which coffee farmers are starting to use once again.

The basis for the analysis will be the cost data presented in Chapter 7 of this report. This will b e complemented by secondary data on the subject including DRC analysis that has been performed. Th e analysis will examine the following categories as measures of efficiency:

- Inputs

- Labor

- Capital/Technology

- Managerial skills

- Infrastructure

- Local Linkages

- Export trends

INPUTS

The main inputs in the production process are cotton, synthetics, dyes and chemicals. The analysis i n Chapter 7 identified high costs of cotton as a significant constraint in Ken ya. The cotton sub-sector has been analyzed thoroughly in Kenya by the Government and the World Bank and as a result it has been full y liberalized recently. The effects of liberalization have not yet been realized but are expected to in the near future as ginning quality and capacity improves and farmers receive adequate incentives for production. In the next few years however, cotton production will be insufficient to meet local demand and will add significantly therefore to the costs of production of Kenyan firms.

In Uganda and Tanzania, thus far, sufficient cotton is being supplied to industry and in the case o f Tanzania, substantial revenue is earned through exports. In Uganda there have been complaints of lo w quality cotton and inadequate supply, but due to the low level of capacity utilization it has not been a major issue. In the medium to long term however, it will be necessary to revitalize cotton growing to meet the expected increase in demand as the publicly owned textile mills are privatized. The government i s committed to doing just that and recent liberalization measures introduced in the 1994/95 budget, i f implemented, will greatly help to facilitate improved production.

In the medium to long term, therefore, cotton should be a raw material of easy access for all thre e countries. Tanzania at present has a comparative advantage over Kenya and Uganda in cotton production as evidenced by its lower prices and exports to Kenya. All other aspects being equal, Tanzania should have a comparative advantage in cotton based textiles vis a vis the other countries. As will be seen however , other factors play just as, if not a more important role in determining comparative advantage.

Dyes and Chemicals

The majority of dyes and chemicals are imported into the region. The prices faced by manufacturer s therefore are world market prices, plus duties and taxes levied on these inputs. From the price dat a collected in the region, the prices faced by Kenya and Uganda are similar. In Tanzania, the prices vary, some being cheaper and others more expensive. Based on the cost structure analyzed in Section 7.2 , Uganda and Kenya have a cost advantage over Tanzania, however a more detailed analysis of prices and level of input use would need to be done to make a definitive conclusion. Kenya has a distinct advantage over Uganda once duties and taxes are removed, since transport cost s add 23 percent to the cost of dyes and

chemicals in Uganda. This is the actual case for exporters in Kenya, as they can claim duty and VA T exemption for all exported products.

As for the world market, none of the countries i n the region has a cost advantage since these inputs are imported. Products that require a significant input of dyes and chemicals will place these countries at a comparative disadvantage. This has been aggravated by liberalization measures in these countries which have resulted in significant currency devaluations making imports even more expensive. This, coupled with high finance costs have made it diffic ult for a number of firms in the region to finance the imports of dyes and chemicals. As a result, production quality has suffered.

Synthetic Inputs

These include Nylon, Polyester, Terylene, Acrylic and Rayon. None of these inputs are produced in the region, they come primarily from Europe either as filaments or chips. The costs of transporting thes e inputs, particularly the chips is very high. As a result, none of the countries in the region have a comparative advantage globally in synthetic based products or blends. Kenya, due to the technology i n place and slightly lower costs, may have a comparative advantage in the region for transforming th e filaments or chips into yarn or fabrics and exporting them to countries in the region.

Evidence from export data from Kenya between March and July 1994 suggests that there are exports of some synthetic products from Kenya to the region. Total exports to the PTA during this period amounted to Kshs 160 million. Of this, 15 percent or Kshs 24 million were synthetic yarns or fabrics. The main export has been polyester yarn or fabric which accounted for 87 percent of synthetic exports. [26]

Data on the precise destination of these exports was not available, however the fact that Kenyan firms are able to export to the PTA is evidence of *regional* comparative advantage, at least for polyester yarn and fabrics. It is doubtful whether this product i s able to compete effectively in international markets however. The World Bank calculated that the s hort run DRC for polyester yarn was 2.25 and the long run DRC was 5.63[27]. The effective protection rate (EPR) was also very high at 806 percent. DRC's and EPR's for other polyester fabrics was just as high (see Table 8.4). Although this data was for 1987, it is indicative of the inefficiency of production for this particular product which was only successful due to the high protection given. Efficiency has probably not improved considerably given the high import content (88 percent). It appears that these Kenyan firms would probably not be able to compete with imports from South East Asia without significant protectio n. They are probably able to penetrate the PTA market due to the preferential tariffs accorded prod ucts from the PTA region. In the long term, however, these firms may not be able to compete as tariff barriers are reduced and cheaper priced synthetics flood the market.

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[26]   Ministry of Commerce, 1994.

[27]   The short run DRC's are based on the assumption that capital is a sunk cost and is fixed. The long run DRC's assume that capital is not fixed but is replaceable in the long run.

Table 8.4 Efficiency Measures for Polyester Yarn and Fabrics in Kenya, 1987

Product	Short Run DRC	Long Run DRC	EPR
Polyester Knitted Fabric	2.35	5.87	749%
Poly/Viscose Woven Fabric	2.67	6.68	609%
Polyester Yarn	2.25	5.63	804%

Source: World Bank, 1987.

Labor

Evidence from Chapter 7 suggests that labor costs in the region are competitive with those of other major textile producing countries. Average wages in Kenya for example are forty times less than those in the US for unskilled workers. They are also less than wages in South Korea, Hong Kong and India. Productivity levels are key to reducing labor costs and increasing competitiveness. Although direct data is not available secondary sources seem to indicate that productivity is highest in Kenya in the region. This, coupled with low wages gives Kenya comparative advantage over Tanzania and Uganda. Kenya's labor productivity is still lower than that of South East Asian countries, particularly in the area of technical and managerial capabilities.[28] There is scope for improvement, therefore, in productivity in all three countries to improve total factor productivity and enhance competitiveness. All three countries however, will have a comparative advantage in low skill and labor-intensive products like T-shirts, shorts and other garments.

Technology/Capital

Although it was not possible to do a detailed assessment of the technology available in each country, some general conclusions can be made about the quality of technology available in East Africa based on discussions with various firms and a review of the literature available. It should be kept in mind that the technology required varies by product, size of the firm and technical know-how. There are firms in the region that have acquired the latest technology and are operating at very efficient levels. In general however, a substantial portion of the technology in the region is outdated and is a major impediment to competitiveness.

The DRC analysis presented in Table 8.5 helps to explain this situation even further. The short run DRC's for Kenya and Uganda are both less than one and therefore indicate relative efficiency. The long run DRC's for Kenya, Uganda and Rwanda all show high inefficiencies particularly for Uganda and Rwanda. The high cost of capital and the age of equipment in the region point out a definite need for capital replacement in the long run. The situation is similar in Tanzania and the DRC's, if calculated, would probably show similar trends.

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[28] World Bank, 1987

Table 8.5 DRC Measures for Countries in East Africa, Textile Industry

COUNTRY	SHORT RUN DRC	LONG RUN DRC
Kenya	0.99	2.13
Uganda	0.12	6.57
Rwanda	—	4.29

Sources: *Kenya: Industrial Sector Policies for Investment and Export Growth,*

World Bank 1987.

Uganda: Studies for the effectiveness of Policies, Facilities and Incentives for Investment Promotion, Maxwell Stamp, June 1993.

Rwanda: Study on the Efficiency and Competitiveness of Manufacturing

Enterprises in Rwanda, DAI, August 1993

Capital replacement will need to be done judicio usly to avoid significant cost impediments to industry. Rivatex in Kenya, for example, has purchased mod ern equipment. Its short run DRC is much less than one indicating efficiency in production. In the long run, however, its DRC's are at unacceptably high level s (4.47-9.8) due to its high capital costs. [29]

The ability to select, bargain for and de ploy appropriate modern equipment is critical in order to avoid the inappropriate purchase of equipment. In the private mills in East Africa like Sunflag, J.V. Textiles and Thika Cloth Mills, evidence is that this capability exists. In the parastatal mills however, this is not a s evident and is aggravated by lack of funds. A judicious transfer of the ownership of these parastatals t o private hands familiar with needs of the industry will help to facilitate improved purchase and use o f technology in the region.

Equipment however, is not the only contributor to enhanced productivity. More significantly, th e productivity of any equipment depends on the engineering and labor skills deployed. A study of a sample of firms in Kenya by Howard Pack found that better production engineering was needed to reduce costs in each of the sample firms. [30] At present the technological requirements in Kenya are met by rigorou s training and input from a number of largely expatriate technicians and textile engineers. In the long run, as the industry becomes increasingly sophisticated, it will be important to enhance indigenous loca l technical capacity. This will help to reduce costs and provide a base for future industrial innovation in the country. There is therefore a need for appropriate higher level technical training facilities in the country to complement the lower level training already present. The degree programs instituted at Kenyatta and Moi Universities are a good start.

The situation is similar in Uganda and Tanzania, but there is a need for training of unskilled workers in addition to skilled technical personnel . In the short term, however, it should be expected that companies will have to rely on in-house training and expatriat e technical know-how to improve production efficiency.

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[29]   World Bank, 1987 pp. 280

[30]   ibid, pp. 284, 285

In this regard, the countries in the East African region are at a comparative disadvantage to countries in Europe and Asia that have a vast po ol of technical expertise to choose from at a relatively lower cost. The long term development of indig enous technical capacity in the region will go a long way to improving the production efficiency and competitiveness of firms in the region.

Other Managerial Skills

A World Bank study of the textile industry in Kenya identified marketing and product design as skills found lacking in Kenyan management. The comparative advantage identified for Kenya in the near future as a result, would be standardized, unbr anded and lower price products as more advanced competitors (the Far Eastern NICs) moved into more differentiated, upmarket higher quality products. The data on recen t exports from Kenya seems to sub stantiate this prognosis. The main exports to the USA and Europe are T-shirts, shorts, yarn and pillowcases. These are relatively simple, low cost products with a high impor t content and requiring very little product design and innovation. The majority of these products ar e manufactured from the EPZ or MUB factories in Kenya, although some firms outside are als o manufacturing for export.

Given similar constraints in Uganda and Tanzania, comparative advantage in these areas would also be likely. The advantage of EPZ's and MUB's with access to relati vely good infrastructure is not yet readily available in Uganda and Tanzania which puts them at a slight comparative disadvantage vis-a-vis Kenya.

Infrastructure

Cheap, readily available and reliable infrastructure is a critical i nput in the production process. The analysis in Chapter 7 highlighted a number of constraints faced by firms in the region. Electricity costs are generally high, but highest in Uganda and Tanzania. Frequent power cuts have affe cted industry in all three countries, but particularly in Uganda and T anzania. Water shortages in Kenya and Tanzania have adversely affected the production and output of a number of firms, particularly in Tanzania.

Telecommu nication costs are also high in all three countries but particularly in Tanzania wher e international calls cost as much as $6.00/ minute. Fuel costs are also high due to government taxes, refinery costs and in the case of Uganda transport costs.

On the whole therefore, infrastructure in all three countries c annot be considered as a major contributor to comparative advantage in textile manufacturing. In fact in many instances it has been a disadvantage. Comparatively, however, Kenya appears to have better infrastructure in place than Uganda or Tanzania. Nevertheless, there is a need for all three countries to focus on improving the infrastructure considerably in order to reduce costs of production in the textile industry and manufacturing in general.

Local Linkages

Apart from local cotton and yarn, textile firms in the region have few backward linkages with the economy. In Kenya for example, the EPZ/MUB firms source all their inputs from overseas, even the fabric. Th e metal/foundry industry is not s ufficiently developed in any of these countries to facilitate the manufacture of spare parts. Some firms have their own inhouse repair workshops bu t this is not dispersed and the benefit to other firms is minimal. The general low level of development of the engineering sector has held back the growth of supplies of spares and equipment. This has greatly affected the costs of operation an d maintenance for textile manufacturers in general . Particularly in parastatal firms, there is considerable idle capacity due to inoperative machines and lack of funds to buy spare parts. The high duties on spare parts have also affected costs of production (45 percent in Kenya for example).

As mentioned earlier, there are also very few technical experts/consultants in the region, which adds to maintenance costs as pr oblems are either solved in-house or left unattended. There is a definite need to

develop technical capacity in the region to better service the industrial sector and create more backward linkages.

Export Markets

Trade in goods by one country is one measure of compa rative advantage in that good, especially now since most of the economie s in the region have reduced effective protection levels considerably. On examining trade trends in East Africa in textiles, only Kenya has considerable exports over the past three years . Uganda and Tanza nia both have considerable potential for expanding exports however, if the appropriate measures are pu t in place to restore capacity utilization and encourage manufacturing for export. Nyanza Textiles in Uganda for example, used to be a major expo rter of fabrics to Kenya and Tanzania in the 1960s prior to the turbulent period in the 1970s and early 1980s. With sufficient investment and introduction of appropriate management, there is no reason why export potential cannot be exploited again.

Data available from Kenya i ndicates that exports began to pick up in 1992 when policies encouraging Manufacturing Under Bond and Export Proc essing Zones were implemented fully (see tables in Appendix 5). Most exporters are part of either of these two schemes. The main exports from Kenya are garments, mainly shirts and shorts, cotton yarn, bedsheets, towels and weaving cones. These exports are mainly for European and American markets.

Since there are no enclaves in Uganda and Tanzania, it would be interesting to know whether firms outside the enclaves are able to compete in export markets. The evidence from Kenya in 1994, seems to suggest that increasingly, textile firms operating outside the enclaves are penetrating export markets (see table 6.3) In fact, whereas in 1993, firms f rom MUB and EPZ 's exported the majority of textiles, between March and July 1994, firms outside the enclaves exported 70 percent of total exports. Part of the reason is that exports to the PTA have increased considerably from a total of Kshs 20 million in 1993 to Kshs. 181 million between March and July 1994. All exports to the PTA have been from non-enclave firms. A whole range of products are being exported t o the PTA but the main ones are blankets, yarn and suiting material. Interestingly, these products are not the same as those imported in bulk, in particular clothes that would have to compete with imported second hand clothes. There are therefore niches in the market where firms are able to compete effectively with imported products. Kenya, therefore has a comparative advantage in producing these products particularly knitted products, which appear to be doing very well in the PT A region. Total exports to the PTA region amounted to Kshs 160 million between March and July 1994; Kshs 89 million or 55.6 percent of these were blankets.

Table 8.6 Textile Exports From Kenya; March - July 1994 (Kshs. million)

	March	April	May	June	July	Total	% Total
MUB& EPZ	45.79	16.11	39.88	55.26	44.81	201.9	30
Others	139.8	71.2	60.48	69.34	119.6	460.4	70

Source: Ministry of Commerce, 1994

Summary and Conclusions

It is clear that there are a number of areas of comparative advantage for the textile industry in the region. On the whole, based on the cost data in C hapter 7, Kenya has a comparative advantage in the manufacture of cotton fabric. The differences however, are not much between the three countries and it appears that with

significant improvements in capacity ut ilization and the costs of infrastructure, both Uganda and Tanzania could reduce their production costs to the same, if not lower, levels than Kenya.

The comparative advantage analysis identified the following points:

- Uganda and Tanzania have a comparative advantage in cotton production and with significan t improvements in other areas could produce very cheap cotton based products. Kenya, if the cotto n industry is revitalized could also be in a similar position in the medium to long term but presently is at a disadvantage vis a vis its neighbors.

- Dyes and chemicals contribute negatively to comparative advantage for all three countries, but more so for Uganda as they face significant transport costs.

- None of the countries in the region have a comparative advantage for synthetic based products in the world market. Kenya has a regional comparative advantage for polyester yarn and fabrics and i s exporting to other PTA countries.

- All countries in the region have a comparative advantage in low skill, labor-intensive products like t-shirts, shorts and other garments. Productivity in the region however, is comparatively low vis a vis South East Asia and if improved would help firms to compete more effectively with the low cos t imports flooding the market at present.

- Due to the low level of technical ex pertise and the high cost of capital, firms in the region do not have a comparative advantage in capital-intensive, high-tech production, at least in the short term. Critical for all three countries is to develop the local technical capacity first and then facilitate greater capital investment.

- Sophisticated marketing skills are also not readily available in the regional context, although slowly as Kenyan firms gain experience in export markets they are becoming increasingly savvy marketers. Still, in the near term, all three countries have a comparative advantage in relatively simple, low cost products like T-shirts, shorts, blankets yarn and pillowcases.

- None of the countries h as a relatively superior infrastructure in the global context. Regionally, Kenya has an advantage due to its slightly superio r infrastructure including the EPZ's. All three countries will need to improve the quality, reliability and cost of the infrastructure in place in order to reduce costs of production to even more competitive levels in the future.

- Backward linkages to industry apart from cotton and yarn are not very prevalent in the region. Thi s affects in particular capital intensive operations that are reliant on spare parts and engineering / maintenance. In the short term, the region has a comparative advantage on simpler operations lik e MUB's cutting, making and packing that are less reliant on outside technical expertise.

- Kenya's increasing presence in the export mar kets in the region and internationally is evidence that the region has the potential to develop efficient, world class industry capable of competing on a globa l scale. Its presence in the export markets is also evidence that presently it has the most competitive and efficient industrial base in the region.

Appendix 1

Statement of Work

COMPARATIVE COSTS OF PRODUCTION ANALYSIS — EAST AFRICA

Background

REDSO/ESA is interested in providing a grant for the services of an African based institution, firm o r individual who will gather and analyze data on the costs of production in East Africa. This will involv e collecting data on labor, rents, utilities, inputs, other variable costs, capital items, and cost of capita l (interest), for comparable produ ction activities. The consultant shall include any other costs, taxes, duties, etc., which may be associated with determining the regional competitiveness of the five countries in East Africa (Kenya, Uganda, Tanzania, Burundi, Rwanda). The analysis will also incorporate comparativ e analysis of transportation costs conduct ed in another study as well as similar studies which may have been conducted recently in the region (Rwanda).

Specific Tasks

The consultant will carry out the following tasks:

1. Selection of sectors for analysis to include sub-sectors of agriculture and manufacturing. These have been pre-selected to include the following:

   - maize,

   - beans,

   - potatoes,

   - coffee,

   - beer brewing and bottling,

   - textiles, and

   - soaps and detergents.

2. Comparative costs of labor, rents, utilities, key inputs, other variable costs, capital items, costs o f capital, and others;

3. Comparative costs associated with the regulatory environment including taxes, etc;

4. Comparative costs of services including tra nsport, insurance, energy (electricity and petroleum inputs) and banking as input costs in the production process of the sub-sectors under review.

5. Analyze the information outlined above to establish a comparative cost structure of production for the selected sub-sectors of the countries in the region. Specifically,

   - The analysis of production costs for each of the above sub-sectors should trace and classif y appropriately, all the relevant and comparable production costs in the five East African countries (Kenya, Uganda, Tanzania, Burundi and Rwanda).

- Production cost analysis will assume a medium to large scale level of activity for the sub-sectors under consideration.

  Small Scale : 11 - 50 Employees

  Medium Scale: 51 - 100 Employees

  Large Scale: 101 & More Employees

- For comparative purposes, the costs should be converted t o US$ equivalent providing the exchange rate used.

- The sub-sector cost analysis shall be summarized into a matrix listing the sub-sector / cos t classification on the one axis and the countries being compared on the other.

6. Rank the five countries in the region, by sub-sector, according to their competitiveness/costs o f production highlighting where countries have a specific advantage ov er others in the region and provide recommendations on how the least competitive countries could improve.

Anticipated Effort

It is anticipated tha t this work will take approximately two months to complete. It is anticipated that field trips to each of the five countries will be made as appropriate. For Rwanda and Burundi, information will have to be collected from secondary sources since it is not advisable to travel to these countries due to civil strife. Some of this analysis has been conducted in a recently completed study by the USAID/Rwand a mission. It is anticipated that the bulk of the work will be conducted from Nairobi. Work plans, selection of sub-sectors, and draft reports will be submitted to REDSO/ESA, AFR/ARTS/FARA/FSP, an d appropriate AID missions for review and comment.

Outputs

The sub-grantee/contractor will be responsible for producing draft and final reports which address all of the analytical requirements outlined above. Draft and final reports will be prepared covering production costs for the region broken down by sub-sector and country. Tables will be provided which allow for easy comparison of cost structures for each country by sub-sector. As appropriate, results will be presented to interested representatives from the private s ector, host governments and donor community as well as other researchers or research institutions.

Appendix 2

Coffee Cost of Production

KENYA

Smallholders producing coffee in Kenya have an average of one acre of coffee per farm. The total 1992 small-scale coffee acreage for all of Kenya was 310,248 acres, with 64 percent of it grown i n Central/Eastern Provinces (approximately 200,000 acres).

The major input activities in Central & Eastern Provinces are the following:

- Manuring

- Minimal spraying

- Pruning activities — change of cycle and handling/desuckering: 35-60 mandays/acre

- Manual weeding: ranges from 27 - 54 mandays per acre

Representative farm cost of product ion budgets are shown for Kenya's main coffee producing areas in Central and Eastern Provinces. These were estimated by the PAM team (a USAID/Egerton Universit y project) and are replicated here. Thanks to the comprehensive work of the PAM team, these detaile d Kenyan COP budgets can be used to compare the crop year 1991/92 (the crop year begins in April, and the coffee is marketed in the following year) to 1992/93, when the world price of coffee had improve d somewhat (for the 1993/94 season, the world price of coffee has doubled since 1991/92).

Cost of Producing Coffee in Nyeri District

Nyeri was chosen as a district representative of many areas in Kenya where due to the past low worl d coffee prices, smallholders have been neglecting their coffee and the practice of intercropping i s widespread. Around 80 percent of Nyeri coffee farmers are intercropping, 10 percent have abandoned their coffee, and 10 percent still maintain purestand coffee. Average district coffee yields range from 130 k g clean coffee per acre to 300 kgs/acre, although yield potentials are as high as 800 kgs/acre clean coffee.

Table A2.1 presents COP data for Nyeri district. From this comparative budge t, it can be seen that input costs increased considerably from 1991/92 to 1992/93, with pesticide costs tripling. This was largely due to the depreciation of the Kenyan Shilling (from around 30 to 60 Shs/$), which increased the cost o f imported chemical inputs. Total costs per hectare increased from $389 to $478 (23 percent).

Table A2.1. Coffee Cost of Production: Kenya * (Nyeri District, Central Province)

COST COMPONENT	UNIT	QUANTITY/ACRE	PRICE KSHS/UNIT 91/92	92/93	COST KSHS/ACRE 91/92	92/93
VARIABLE						
Green Copper	lt	1.5	8	210	117	315
Fenitrothion	debe	0.5	170	650	85	325
Manure	bags	270	3	5	810	1350
Bags		15.9	10	10	159	159
Transport		1	738	155	738	155
TOTAL VARIABLE COSTS					1909	2304
TOTAL FIXED (Annualized)					2374	3037
LABOR COST					5149	5149
TOTAL COST (KShs/Acre)					9432	10490
TOTAL COST ($U.S./Acre)					171	210

Where: 1991/92 (Oct-Sept) KShs/$U.S.= 55, 1992/93 (Oct-Sept) KShs/$U.S.= 50

This budget assumes very low input use.

Labor costs make up almost 50 percent of total costs, while chemical input costs account for only 6 percent of the total in this particular low-input scenario. For farmers using low levels of inputs, thes e percentages have not changed much over the last 10 years. In 1981/82, it was estimated that the percent of total smallholder costs from labor was 55 percent, and from chemicals and fertilizers 20 percen t (Kristjanson et al, 1990).

To compare the profitability at differen t management levels, the low maintenance assumptions budget for 1992/93 (i.e. low input use, yields of 1,190 kg/acre cherry) is compared to the average maintenanc e assumptions budget (i.e. higher input use, includ ing use of insecticide summithion and fertilizers CAN and 20:20:10, with yields of 2,400 kgs/acre cherry) (Table A2.2).

Table A2.2 Comparative Profitability of Different Management Levels

MANAGEMENT ASSUMPTION	PROFIT IN KSHS/ACRE	
	1991/92	**1992/93**
Low Input Technology	- 887	19,842
Average Input Technology	3,049	43,170

Low input: assumes very low input use: 1.5 kgs/acre Green Copper; .5 liters/acre Fenitrothion; yields of 1,190 kg/acre cherry

Average input: assumes higher input use: insecticide Summithion (1 liters/acre); herbicide, Gramoxone (.5 liters/acre); fertilizers CAN (150 kgs/acre) and 20:20:10 (124 kgs/acre); yields of 2,400 kgs/acre cherry

Returns to coffee were negative in 1991/92 but much higher in 1992/93, la rgely due to the higher output price, particularly for the average maintenance scenario, which yielded profits of 43,170 KShs/acre, o r roughly $863/acre.

The PAM study included crop budgets for a range of districts in Central and Eastern Province for the 1991/92 crop year, and profitability ranged from -1600 KShs/acre to 4,400 KShs/acre (still very low, a t roughly $80/acre). Farm-level coffee prices have increased significantly, however, from 9-10 Shs/kg for cherry in 1992 to 18-28 Shs/kg in 1993 to 3 to 4 times the 1993 level in 1994.

Cost of Chemical Inputs

Table A2.3 shows that estate farmers are spending 5 times as much on chemical inputs as small-scal e farmers, and are getting yields up to 3.5 times as high (5300 kg cherry/acre for estates compared to 1500 kg cherry per acre for smallholders).

For smallholders, the 1991/92 PAM budgets show that disease and pest control costs were lowest in Nyeri at 240 KShs/acre ($4.40/acre), and highest in Meru South (low elevation) at 818 KShs/acr e ($14.87/acre). Most of pest control costs in Meru South were for the insecticide summithion.

Table A2.3 Kenya Input Use and Cost: 1992/93 crop season

TYPE OF INPUT	PRICE RANGE —1992/93 KSHS/ACRE	LEVEL OF USE *FREQUENCY
SMALL-SCALE FARMERS		
Fertilizers		
DAP	498	17-25 kgs/acre * 2
CAN	880	63 kgs/acre * 2
Herbicides		
Gramoxone	499	.8 l/acre * 2
Insecticides/Fungicides		
Green Copper	123	1.15 kgs/acre * 2
Summithion	432	1 l/acre - .8 l/acre * 2
Lebaycide	331	.5 l/acre * 2
Dithane	243	.5 kg/acre * 1
Fenitrothion	85	.5 l/acre * 1
TOTAL SMALL-SCALE (KShs/Acre)*	1934	
TOTAL SMALL-SCALE ($/Acre)	$38.68	
ESTATE FARMERS		
Herbicides		
Roundup	930	.38 kg/acre * 4
Fertilizers		
CAN	2036	55 kgs/acre * 5
20:10:10	933	52 kgs/acre * 2
Bayfolan	53	.92 l * 1
Potash	305	108 kgs/acre * 1
Pests and Diseases		
Green Copper	1469	2.26 kgs/acre * 9
Red Copper	490	2.2 kgs/ace * 3
Daconil	1910	.88 l/acre * 6
Captafol	1100	.88 l/acre * 5
Bayleton	454	.4 l/acre * 1
TOTAL ESTATE (KShs/Acre)	9874	
TOTAL ESTATE ($/Acre)	$197	

If a SS farmer was to use CAN, Green Copper, Summithion and Gramoxone. Actual input use for controlling diseases and pests was much lower, according to the 1991/92 PAM budgets, ranging from a low of $4.40/acre to $14.87/acre.

Source: Kristine Crandall, PAM Proceedings, June 1993.

Labor Costs

Smallholder labor costs r anged from 1,730 Shs/acre to 8,502 Shs/acre across regions in Kenya, averaging around 6,000 Shs/acre ($109/acre). Estate labor costs were twice as high, at over 11,000 Shs/acre i n 1991/92.

For farmers using better management practices, the PAM budgets show that the proportion of tota l costs taken up by labor costs falls from around 50 percent to 25 percent of total costs, while chemical inputs costs increase from 20 percent to up to 60 percent of total costs (for the low-input case).

Processing Costs

One of the findings of the PA M team's analysis of coffee was that many farmers receive lower prices due to inefficient management of p ost-farm operations at the factory and cooperative society levels (Crandall, 1993 and Nyoro, 1994). They concluded that the decline in cof fee payments to farmers due to falling world prices was exacerbated by excess processing, handling, and marketing costs coupled with poor financial management by cooperative societies. An examination of processing costs for 10 cooperative factorie s showed costs ranging from around 9,000 to 17,0 00 Shs/mt clean coffee, compared to an estate factory cost of 7,600 Shs/mt. Efficiency can be measured by the percentage of gross cherry price received by farmers, which ranged from 59 percent for inefficient factories to 78 percent for well-managed ones. Hig h cooperative costs are largely attributed to:

- High labor costs (6,000 Shs/mt for some cooperatives versus 1,000 Shs/mt clean coffee for estat e factories) — many managers gauge their popularity by the number of persons employed.

- Poor management since most cooperativ e managers have little or no management skills — committee members are often elected on the basis of political patronage.

- Lack of incentives for managers to increase payments to farmers (many society managemen t committee members do not draw a salary but rather an allowance based on the number of meetin g held) (Nyoro, 1994).

Nyoro's analysis found that if three improvem ents with respect to increasing processing and marketing efficiency were to be made — improvements in labor management by cooperatives, increased capacit y utilization through closing some factories, and removal of the monopoly of CBK in auctioning coffee — coffee payments to farmers as a prop ortion of FOB prices would increase from 57 percent in cooperatives to 77 percent for smallholders, and from 71 percent to 82 percent in the estate sector.

COST OF PRODUCTION OF COFFEE IN UGANDA

In Uganda, the cof fee industry is based entirely on smallholder production, and Robusta coffee is a much more important crop than Arabica. Robusta accounts for 94 percent of output and Arabica 6 percent (World Bank Ag. Sector Review, 1993). In the 1992/93 crop year (Oct. - Sept.) there were 204,900 hectares under Robusta production compared to 28,700 ha of Arabica (64,575 acres). Kenya's small-scale Arabica area of 310,000 acres is roughly 5 times larger.

The soil, rainfall, and climate in Uganda are very f avorable for Robusta. Actual Robusta yields seldom exceed 600 kg/ha clean coffee, whil e Arabica yields have remained at around 450 kg/ha clean coffee over the last few years (about 60 to 75 percent of reasonable yields under smallholder conditions). Some of the reasons for these low yields include aging Robusta trees, a lack of new Robusta planting material , competition from other crops, poor field practices, declining Robusta quality, and fungus diseases i n

Arabica. All existing varieties of Arabica are susceptible to leaf rust (at lower altitudes) and Coffee Berry Disease (at higher altitudes) leading to severe annual crop loss. Virtually no spraying for leaf rust i s undertaken.

To understand why coffee has been so neglected in recent years, it is important to note that th e farmgate price of coffee dropped in real terms from 1972 through 1980 (when it reached its lowest point with the fall of Amin). By 1984, due to structural adjustment efforts, the farmgate price of coffee gradually rose to 64 percent of its 1970 value. From 1984-1991, the real farmgate price again declined until a policy reversal in 1991.[31] In July 1991, CMB's monopoly was eliminated along with Government-set processing margins. The final step in the liberaliza tion process was taken in March 1992, when coffee exporters were allowed to convert their earnings at the market rate of exchange, and the determination of the farmgat e price of coffee was left to the market.

Every six months, the Agricultural Secretariat in the Bank of Uganda surveys farmgate productio n costs, input quantities, and output prices, then evaluates gross margins and smallholder productio n incentives for Uganda's main crops. The Secretariat's findings for the 1992/93 crop year were that th e financial returns to Arabica production, per labo r day — or any other measure are low, still below matoke (banana, at 1669 Shs/day), but improved considerably over previous years. At US $1.54 per day (145 1 UShs/day), returns to Arabica coffee production were able to cover market daily wage, which averaged around UShs 1000 ($1.06) in 1993 (see Table A2.7).

The Secretariat also assessed the far mer's share of the realized export market price, and found that the situation had improved significantly since the liberalization in 1991/92, with coffee farmers receiving 50 percent of the world price, up from around 30 percent. This improved even more during the first thre e quarters of the 1993/94 season in part due to huge increases in world market prices. The world price o f Arabica coffee has recently reached $2.04/lb., up from around $.90/lb in April, 1994.

The average price paid to Uga ndan farmers increased from 471 Shs/kg in April 1992 to 600 Shs/kg in April 1993, to 820 UShs/kg (around $.89/kg) for Arabica parchment in Ju ne 1994 an increase of 74 percent over 2 years (see Table A2.4).

Table A2.4 Average Yields and Producer Prices: Arabica Coffee in Uganda

TYPE OF COFFEE	YIELDS (1992/93) KG/HA	PRODUCER PRICE (USHS/KG)	
		Oct. 1992	Sept. 1993
Parchment	6501200 kgs/ha		
Clean	518960 kgs/ha (230426 kgs/acre)	470 UShs	700 UShs

Cost of Production

Table A2.5 shows COP of Arabica coffee in 1992/93 for an "improved manage ment" scenario[32]. Total costs per hectare were around 508,000 UShs (roughly $490 at an average 1992/93 exchange rate of 1036). At a yield of 1200 kgs/ha, this implies a unit cost of 423 UShs/kg, or around $.41/kg parchment coffee.

Table A2.5. Coffee Budget for Arabica Coffee* 1992/93: Uganda

VARIABLE INPUTS	UShs/ha.
Fertilizers	100000
Insecticides/Fungicides	48000
Herbicides	48000
Manure/Mulch	0
Transport	8000
Depreciation	38283
TOTAL VARIABLE COSTS	242283
FIXED INPUTS (Annualized)	75264
LABOR COST	190400
TOTAL COST	507947
Yield (kgs/ha parchment)	1200
UNIT COST (PER KG.)	423

Source: Bank of Uganda Agricultural Secretariat, 1993.

*Improved Management Assumptions

Cost of Chemical Inputs

Table A2.6 Cost of Chemical Inputs Used on SS Coffee: Uganda

TYPE OF CHEMICAL INPUT	AVERAGE PRICE: 1992
Fungicides (Dithane)	$9.89/kg
Pesticides (Summithion)	$8.20/liter

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[32]   Recent information from the Uganda Coffee Development Authority indicates Arabica coffee yields in Uganda range from 450 to 750 Kgs. dry parchment per hectare, with a conversion rate from fresh cherry to dry parchment of around 22 percent.

Herbicides (Roundup, Gramaxone)	$11.80/liter			
Herbicides (Others)	$4.95/kg			
Fertilizers (NPK,CAN,ASN,SSP)	$.35/kg			

Source: Bank of Uganda Agricultural Secretariat, Nov. 1993

Average input use is not known, but budgets show 48,000 196,000 UShs/ha spent on all chemical inputs for traditional and improved Arabica, respectively ($51/ha $208/ha, or $23$92/acre).

Cost and Returns to Labor

Family labor constitutes about 70 percent of total coffee production labor, and the cost of hired labor in Uganda was around 800 Shs/day ($.77/day) during the 1992/93 coffee season (see Table A2.8). In terms of returns to family labor, arabica coffee ranked 11th in an analysis of returns to 28 food and cash crops, with robusta ranking last. A major competing food crop, matoke (banana) ranked 9th with returns greater than arabica's. NTE's such as vanilla, cardamom and silk had returns up to twice as high as arabica.

Table A2.8 Returns to Labor: Uganda

CROP	YIELD PARCHMENT kg/ha	PRODUCER PRICE Ushs/kg	GROSS INCOME Ushs/ha	VARIABLE COSTS Ushs/ha	GROSS MARGIN Ushs/kg	FAMILY LABOR MD/ha	RETURN TO LABOR Shs/MD
Robusta	1200	280	336000	250800	85200	130	655
Arabica	650	600	390000	166558	223442	154	1451
Matoke	9250	80	740000	372800	367200	220	1669

Source: Bank of Uganda Agricultural Secretariat, 1993.

Processing and Marketing Costs

The cost of processing Arabica were estimated at 201 Shs/kg in 1993 (approximately $.20/kg). Th e producer price at this time was 700 Shs/kg clean coffee, implying processing costs of 28 percent of th e farm price. A recent study concluded that prior to liberalization in 1991/92, tax on exports and intermediary margins took away 70 to 80 percent of the realized world price. After the removal of taxes, liberalization of foreign exchange, and improved processing and marketing efficiency as a result of liberalization and increased competition have enabled coffee farmers to receive around 50 percent or higher of the worl d market price (Bank of Uganda, 1993).

TANZANIA

Mild Arabica accounts for roughly 70 percent of Tanzania's annual coffee production. It is grown mainly in the highlands of Arusha and Kilimanjaro regions in the north, and Mbeya and Ruvuma highlands in the

south. Over 90 percent of coffee is grown by smallholders on very small plots. Up to 80 percent of th e smallholder area is intercropped with bananas. Traditionally, very low amounts of inputs have been used, including labor for pruning, weeding and mulching, and fertilizer. Fungicide sprays were applied during the period in which they were heavily subsidized, but even then at rates lower than those recommended. Increasing input prices and the requirement of cash for these inputs was estimated to have lowered total input use by 2530 percent over the period 1989 through 1992/93 (MDB, Dec. 1993).

Yields in Tanzania are very low, with a national average yield in 1992/93 of 94 kgs/acre (211 kgs/ha) for smallholders. Declining production, quality, and yields are blamed on the following factors:

- Aging trees, especially in the north where most of the trees are over 45 years old

- Higher incidence of disease

- Unreliable supplies of chemical inputs, and too frequent institutional changes in the organizations that deliver support services to the industry

- Inadequate use of chemicals due to high costs

- High marketing costs

- Unattractive producer prices

Before the 1992/93 season, producer prices were fixed by the Government. They are now liberalized, and farmers may sell either to Cooperative Unions (where they receive an initial payment, second payment, and final payment based on the crop's export value, or to private traders who pay upon purchase of th e coffee beans (i.e. before the quality is known).

Cost of Production

Table A2.9 presents an Arabica crop budget based on average input assumption for Tanzania in 1992/93. Total variable costs were 79775/ha.

At a yield of 750 kgs/ha, this implies a cost of production of 283 TShs/kg ($.75/kg). In 1992, th e producer price ranged from 155267 TShs/kg, implying Tanzanian coffee farmers were losing money.

Table A2.9 Arabica Cost of Production: Tanzania Production Year: 1991/92; Marketing Year 1992/93

COST COMPONENT	QUANTITY (Kgs/ha)	PRICE (TShs/kg)	AMOUNT (TShs/ha)
Manure/Mulch	1890	10	18900
Fertilizer NPK	250	67	16750
Pesticides	7.5	1500	11250
Fungicides	27.5	1000	27500
Gunny Bags (number)	15	25	375
Depreciation			3500
Transport			1500

	Mandays	TShs/manday	TShs
TOTAL VARIABLE COSTS		2577	79775
LABOR COSTS	325	300	97500
FIXED COSTS (ANNUALIZED)			35183
TOTAL COSTS			212458

Source: World Bank, 1992

Chemical Input Costs

The principal cultivars of Arabica used in Tanzania are both highly susceptible to coffee leaf rust an d coffee berry disease. During the 1970's and 1980's a number of donors provided farmers with fungicides at subsidized prices. Since 1992, farmers have had to pay the market price, and apparently the use o f fungicides has declined considerably. For the 1991/92 cropping year, the World Bank study estimated the cost of a fungicide spray program for arabica at 25 percent of direct production costs, and it attribute s decreases in yields from around 400 kg/ha clean coffee in 1981/82 to some 230 kg/ha clean coffee i n 1991/92 largely to the decline in the use of fungicides. Table A2.10 shows the price and average amount of chemical inputs used within the representative Tanzanian coffee budgets.

Table A2.10 Average Coffee Input Use and Cost in Tanzania: 1992

TYPE OF INPUT	AVERAGE QUANTITY USED (kgs/ha)	PRICE (Tshs/kg)
Fertilizer		
NPK	250	67
CAN	250	52
Pesticides	7.5	1500
Fungicides	27.5	1000
Manure/Mulch	1890	10

Source: World Bank, Tanzania Ag. Sector Memorandum, Nov. 1992.

Labor Costs

Family labor is estimated to constitute 70 to 80 perce nt of total labor employed in the production of coffee. The opportunity cost for family labor can be estimated using either the hired labor wage rate, or return to family labor in competing crops. Th e crop budgets presented here used a hired wage rate of 300 TShs/day for 1992 (around $.80/day).

Comparative returns to family labor for several cash as well as food crops are presented in Table A2.11.

Table A2.11 Returns to Labor: Tanzania

CROP	YIELD kg/ha	PRO-DUCER PRICE TShs/kg	VALUE OF OUTPUT TShs/ha	VARIABLE COST TShs/ha	GROSS MARGIN TShs/ha	FAMILY LABOR MD/ha	RETURN TO FAMILY LABOR Shs/MD
Arabica	750	155	116250	142168	25918	270	96
Robusta	1500	50	75000	88585	13585	170	80
Tea	5000	40	200000	103950	96050	300	320
Cashew	1100	100	110000	43000	67000	90	744
Maize	4500	35	157500	56843	100658	112	899

Source: World Bank, 1992.

In 1992, coffee ranked last in an analysis of returns to 15 different crops, with negative returns (i.e . even lower than the prevailing rural wage rate). This largely reflected the fact that food crops wer e liberalized earlier than coffee was, and free ma rket prices were providing higher returns than were the still controlled coffee crop. With liberalization and the recent strong increase in world coffee prices (the price the producer has received has increased significantly since 1992), this is sure to have become mor e favorable.

PROCESSING AND MARKETING COSTS

Processing and marketing inefficiencies due to low throughput and excess capacity raise the unit cost of coffee exported from Tanzania, as well as lower the price received by farmers. One of the ways to get an idea of how large these marketing costs and inefficiencies are is to look at the farmer's share of the world price realized (see Table A2.12).

Table A2.12 1991/92 Farmer's Share of Export Price in Tanzania

COMMODITY	BORDER PRICE $/kg	PRODUCER PRICE Shs/kg	FARMERS SHARE (%) At OER	At MER
Arabica	1.50	155	39	32
Robusta	.75	50	37	31
Maize	.12	35		73

Source: World Bank, 1992.

OER Official exchange rate; MER Market exchange rate.

At 32 percent of the world price in 1991/92, Tanzanian coffee farmers were r eceiving among the lowest share of the export price in the world. A large part of this was due to inefficient Cooperative Unions with large debts. By 1992/93 the pr ice producers were receiving for Arabica had risen to 230280 Shs/kg, while the auction price realized was 354470 Shs/kg, increasing the farmer's share to over 50 percent.

Appendix 3

Maize Cost of Production

MAIZE COST OF PRODUCTION IN KENYA

Maize production in Kenya takes place under both large-scale and smallholder production systems. It is estimated that smallholder farms produce about 708 0 percent of Kenyan maize while the large-scale farms account for the remaining 2030 percent (AkelloOguttu and Odhiambo, 1986; Odhiambo et al., 1994). The large scale farms are found mostly in the Rift Valley Province in such districts as Trans Nzoia, Uasin Gishu and Nakuru and in some parts of Kisii/Nyamira, and in Kakamega districts in Nyanza and Wester n Provinces.

The large scale production system is fully commercially oriented and employs a lot of moder n purchased inputs like machinery, fertilizers, and other agrochemicals. Smallholder maize production, on the other hand, takes place under varied technology and levels of husba ndry, ranging from basic subsistence production in some areas to commercially oriented production employing similar purchased inputs found on the large farms. Given su ch a diverse production system, a definition of a representative maize farm is therefore not easy to portray for Kenya.

For the purposes of this study a repr esentative crop budget was chosen for the large-scale farms found in Trans Nzoia and Uasin Gishu districts. The small scale crop budgets are derived from a typica l smallholder in one of the maize surplus districts such as Nandi, Bungoma, Kisii, Nyamira and Kericho. These detailed crop budgets for small and large-scale maize in Kenya are presented in Appendix Tables A3.1 to A3.6. The analysis is based on information for the 1993 crop year.

In summary, on per hectare basis, a typical smallholder maize producer in the maize surplus areas of Kenya carry out the following average husbandry practices:

- Hires tractor and machinery services for land preparation (ploughin g and harrowing) costing $67.12/ha;

- Uses about 84 mandays of labor, costing $60.14/ha;

- Uses intermediate inputs including fertilizers, hybrid seed, gunnies and other material inputs, costing $330/ha.

The total variable costs for such a farmer is estimated at $390.19/ha, which almost represents his total costs since he has negligible attributable nonvariable or fixed costs of production ($1.69/ha.). Thus th e smallholder maize grower makes a profit of about $531/ha, or $0.11 per kg of maize produced.

Smallholders in Kenya producing maize under intercropping usually use beans, millet, sorghum , potatoes or other minor crops with the maize crop. The most common practice is intercropping of maize with beans. A typic al cost of production budget for such a system is presented in the Table A3.3. Usually such intercrops have maize as the main crop and the beans as the suppl ementary crop. The yield per hectare for both crops is much lower than those obtained in pure stands. For example, in this study a yield of 2224 kilograms per hectare for maize and 667 kilograms for beans is assumed. The revenue expected from   a hectare of maize is around $411 while the revenue for beans is $249, giving a total revenue of about $660

per hectare. This production system is estimated to use about 73.5 mandays per hectare at a cost of about $44. The major material inputs are: planting seed for maize and beans and moderate levels of fertilizers and gunny bags, all estimated to cost about $167 per hectare. The nonvariable costs are negligible, a t $0.85/ha. Total costs therefore come to $211 per hectare, or $ 0.10 per kilogram. With this kind of cos t structure, the maize/bean intercrop is expected to give a profit of about $448 per hectare or $0.15 pe r kilogram.

Maize beans intercropping systems are common on smallholder farms where mechanized planting and weeding are not practiced. It is also popular because it enables farmers to diversify and produce two o r more crops on one plot and within the same operations. Where beans are involved, farmers also benefi t from nitrogen fixation which improves soil cover and fertility and increases maize yields.

Turning to the large-scale maize production sy stem in Kenya, on average most of the farmers use high input levels and practice g ood crop husbandry. The system uses more machinery services and is therefore less labor intensive, using only about 56 mandays per hectare at a cost of about $37. There is muc h emphasis on the use of purchased material inputs such as fertilizers for planting and top dressing, hybrid seed, insecticides, herbicides and also h iring of machinery services for farm operations and transportation. The intermediate and other material input expenses amount to about $650, g iving a total variable cost figure of $687/ha, and a gross margin of $477/ha, implying a return to family labor of $8.52 per day. The fixed cost element, i.e. depreciation, insurance charges, and other overheads, is estimated at $85/ha, and i s significantly higher than the fixed costs faced by small farmers.

As expected, the large-scale farms also have higher total costs for maize production. The estimate d total cost is around $772 per hectare or $ 0.12 p er kilogram, thus leaving a profit of about $392 per hectare or $0.06 per kilogram.

COST OF MAIZE PRODUCTION IN TANZANIA

Maize in Tanzania is produced mainly by smallholders. The major maize surplus areas include the we t highland regions of Arusha, Iringa, Mbeya, Rukwa and Ruvuma, which together account for about 5 0 percent of annual production in the country. Other areas with significant maize production include parts of Bukoba, Moshi, Pare, Ngara, Kibondo, Morogoro, Rungwe and Songea.

The total annual maize production in Tanzania is now estimated to be about 2.2 million tons . Production has steadily increased, rising from 870,000 tons in 1970 to its current level of about 2.2 million tons per year. The production increase is largely due to the expansion of area under the crop and to some extent due to improvement in average yields, which have risen from about 0.86 tons per hectare in 1970 to about 1.6 tons per hectare at the moment.

In the crop budget and cost of production a nalysis presented for Tanzanian maize (see Table A3.4), an average yield of 5000 kilograms per hectare under high level input technology is represented by th e situation in the Arusha region. The medium input technology is represented by the Dodoma situation, where average yields are estimated at around 4500 kilograms per hectare (Shetty et al, 1992; Mdadila, 1993).

The production system under high input technology (Arusha) is characterized by a mixture o f mechanization and labor intensive operations. Land p reparations (ploughing and harrowing) is mechanized on some farms, while other operations like planting, weeding, fertilizer applications and chemica l applications are based on either labor supplie d by the family or hired. It is estimated that maize production under such a situation requires about 107 mandays per hectare, at a cost of about $86 per hectare. Th e intermediate and other material inputs used include machinery (usually hired), fertilizers (Triple Supe r

Phosphate and Sulphate of Ammonia), insecticides, gunny bags, transportation facilities and workin g capital all estimated to cost about $146 per hectare.

Total variable costs for a typical Arusha maize farmer are $232/ha. With an expected total revenu e estimated at $555/ha, the gross margin comes to $324 per hectare, or a return to labor of $3.03/manday. The nonvariable costs, represented mainly by depreciation of machinery and tools, are estimated at about $7.78/ha. Thus the total cost for such an area stands at about $239/ha or $0.05/kg. The profit of a maize enterprise in this example is around $327 per hectare or $0.06 per kilogram.

Under the medium input technology (represented by the Dodoma area), yields are estimated at 4500 kilograms per hectare. Farm operations are slightly more labor in tensive (about 127 mandays/ha) compared to the high input technology. Under this si tuation, land preparation, planting, and weeding are mostly done by hand using a hoe. Material inputs such as fertilizers, insectici des, gunny bags and transportation are used in moderation. With nonvariable costs (mainly depreciation) estimated at about $3.89/ha, the total cost of production comes to $205 per hectare, or $0.05/kg. It is worth noting that total production costs unde r medium input technolog y are no different than total costs under the high input situation. This implies that the reduction in the use of intermediate and other material inputs, though appearing to save on cost, i s negatively compensated for by the lower yields resulting from low use of such inputs. Profits from th e medium input production system are also slightly below those realized under the high input situation i.e. $289.20 per hectare, or $0.06/kg instead of $326.66 per hectare and $0.07/kg.

COST OF MAIZE PRODUCTION IN UGANDA

Maize is grown in most parts of Uganda and is estimated to cover about 10 per cent of the annual crop area in the country. The main deficit areas as far as maize production is concerned are mainly in: (a) th e Northern Region (Arua, Nebbi, Kotido and Moroto); (b) the Central Region (Rakai and Masaka); © the Western Region (Mbarara and parts of Kabarole).

Whereas in Kenya and Tanzania, maize is regarded as a major staple, in Uganda the crop is relatively unimportant as a staple and is surpassed in this respect by bananas (*matoke*) in the south and by finge r millet and sorghum in the north. However, in terms of cereals production, maize ranks second to millet. The production is largely if not wholly smallholder ba sed and is characterized by low input technology and poor husbandry practices. Yields are therefore relatively low compared to Kenya and Tanzania (see Table A3.1 A3.5). There is a widespread belief among most farmers that Uganda's soils are fertile enough and do not require fertilizers. Another problem is lack of reliable and extensive input distribution systems for agricultural inputs in rural areas. The few that exist are found only in major trading centers which ar e typically located far away from the farmers needing the inputs.

The average national yield of maize in Uganda is about 1300 kilograms per hectare, however for the purposes of this study an average yield of 2000 kilograms per hectare is used. This is also the figure used by the Bank of Uganda Agricultural Secretariat in its 1993 report on the Economics of Crop Production.

From Table A3.5, it can be seen that under average crop husbandry practices, maize production costs $242 per hectare, or $0.12 per kilogram. The costs are broken down as follows:

- Total labor input costs make up $141/ha;

- Intermediate and other material inputs cost about $100 per hectare;

- Total variable (a + b) inputs are around $241 per hectare;

- Non variable or fixed costs are negligible and estimated at $0.97 per hectare. Production is very labor intensive, using about 183 mandays per hectare, with few modern purchased inputs.

Because of low input technology and the resultant low yields, returns and profitability from maiz e production in Uganda is low and negative in some cases. Gross margins are estimated at $ 48 per hectare and $0.26/day. Profits are estimated at $ 49 per hectare, implying returns to labor of $ 0.02 per day.

It is reckoned that under such negative returns, maize in Uganda is mostly grown by smallholde r subsistence farmers who may not be placing high opportunity cost on their family labor and are not using borrowed capital.

Appendix 4

Beans Cost of Production

This section is devoted to the analysis of cost of production for beans at the country level. The results from each country beans crop budget and costs are us ed in Chapter 5 for intercountry comparative cost analysis.

Beans in Africa is basically a smallholder crop. They are by far the most important pulse crop in the region grown for both home consumption and as a cash earning enterprise. For the purpose of this study, the term **beans** is used to refer to dry beans or field beans of the *Phaseolus Vulgaris L* species commonly grown and used in East Africa.

COST OF PRODUCTION FOR BEANS IN KENYA

Beans are widely grown in Kenya mainly by smallholders who in most cases plant it intercropped wit h maize, sorghum, potatoes and other crops. It is estimated that 63 percent of the total maize area i s intercropped with beans, especially in the regions of the country where land and labor constraints are a problem. The major bean producing areas in Kenya are:

- All the districts in Central Province (i.e. Kiambu, Nyeri, Muranga, Kirinyaga and Nyandarua);

- Meru and Embu districts in Eastern Province;

- Kakamega, Vihiga, Bungoma and Busia districts in Western Province;

- Kisii, Nyamira, Migori and Kuria districts in Nyanza Province and

- Parts of Taita, Taveta and Kwale districts in the Coast Province.

In Kenya it is possible to grow one or two crops of beans in a year depending on the region, altitude and rainfall pattern. Most regions grow beans in the long rains (March June) while some regions in the medium to low altitude with bimodal rainfall pattern grow a second crop during the short rains (September December).

Bean production statistics indicat e that there has been a steady increase in the total output, largely due to area expansion, while y ields have persistently remained low (see Table A4.5). Between 1970 and 1991 the area under beans in Kenya grew from 152,000 hectares to about 501,000 hectares. During the sam e period production grew at an average annual rate of about 9.9 per cent per year from 65,000 tons t o 215,000 tons. Yields per hectare, on the other hand, grew at an average annual rate of 3.5 percent, from 0.4 tons/ha to about 0.85 tons/ha.

The cost of production analysis considered both the purestand and intercropped systems. In the case of a purestand crop, the study took what would be regarded as an average medium to high input technology in a typical bean growing area in the country. The intercropped production system chosen for the analysis represents a typical average low to medium input technology prevailing in the bean growing areas of Kenya such as Kisii, Kakamega, Kiambu, Nyeri and Muranga districts where beans are grown in conjunction with

maize and other crops. The case prese nted however, is an intercrop between maize and beans which is the widespread intercrop practice in the country.

As with the other crops included in this study, the data used for beans crop budget and cost analysis are mainly synthesized from se condary sources and are based on or adjusted for 1993 cropping situations and prices.

As far as the beans pure stand crop budget and costs of production are concerned, a typical goo d husbandry practice was taken to be capable of realizing a yield of about 2200 kilograms per hectare. Such a production system would normally be expected to use rela tively higher level of modern purchased inputs, including:

- Hired machinery services for land preparation;

- Fertilizers;

- Pesticides like insecticides and fungicides;

- Improved seed; and

- Transport services and working capital.

Indeed, the study found that such intermediate or material inputs constitute the bulk of the tota l production costs. It was estimated that such inputs, as a group, cost about $318 per hectare. The nex t important cost element, as would be expected under such smallholder production system is labor inputs for such operations like planting, weeding, fertilizer application, and handling. It is estimated that about 106 mandays would be required for these operations at a cost of about $72/ha.

The total variable cost for the beans purestand was estimated at $390/ha, or about $0.18/kg. Th e nonvariable (fixed) costs were also estimated to be about $1.69/ha, giving a total cost of about $392/ha or $0.18/kg. With the total revenue being estimated at $1044/ha, the purestand bean production syste m generates a gross margin of about $654/ha or $6.17 per manday. The gross margins after adjustment for nonvariable costs result in estimated profit of about $652/ha or $0.30/kg. The detailed analysis is presented in Tables A4.1 to A4.3.

Analysis of bean intercrop production costs in Kenya was meant to depict the situation prevailing on most smallholder farms where beans are produced mainly for subsistence purposes, with any surpluses in a good year for sale. In t his production system, it is assumed that the farmers use mostly family labor and limited purchased inputs. The labor input is estima ted at about 73.3 mandays per hectare with an estimated cost of about $44/ha for both maize and beans. The farmers use less amounts of fertilizers but n o insecticides, fungicides and herbicides. All the int ermediate and material inputs are estimated to cost about $167/ha, again for both maize and beans operations.

The cost of production for two or more crops in an intercrop production s ystem are so extricably related that it would be a futile exercise to try and disaggregate such costs between maize and beans. Operations such as land preparations, weeding and fertilize r application are jointly done for the two crops, while other operations are specific to each crop within an intercrop system. In the aggregate budget and cost analysis, the maize and beans are estimated to cost about $212/ha, which comes to about $0.07/kg. of either of the crops. The profitability analysis indicates that such an intercrop would earn a combined profit of abou t $448/ha or $0.15/kg of either crop.

As can be seen from the preceding discussions and from Tables A4.1 to A4.3 and A3.3, the cost of bean production under the intercrop system is slightly lower than that of producing beans in purestand.

COST OF BEAN PRODUCTION IN UGANDA

Bean production in Uganda is currently estimated at about 400,000 tons per year. The area under the crop is estimated to be about 500,000 hectares, thus giving an average crop yield of 0.8 tons per hectare (see Table A4.5). Beans are grown in virtually all parts of Uganda under smallholder conditions. Just as is the case with maize, the only areas that can be regarded as bean deficit are the central and some parts of western Uganda where bananas (*matoke*) and millet tend to predominate.

Bean production in Uganda, like that of maize, is still low technology bordering very much on subsistence production. Consultations with research and agricultural experts in Uganda reveal that Uganda could easily double its current yield levels if only farmers could improve on their crop husbandry practices and also adopt existing high yielding bean varieties.

The cost of production analysis presented here assumes what by Uganda standards would be regarded as an average good farm level performance and data synthesized from secondary sources and counter checked through consultations with Ugandan experts and farmers. The budgets and costs were first calculated in local currency and later converted into US dollars using the average exchange rate prevailing for the year 1993 (see Tables A4.1 through A4.3).

Yields under the situation depicted above were assumed to be about 800 kg/ha, resulting in total revenues of about $181/ha. Labor and land are the major inputs in the production system. However, since land is mostly inherited and passed down through each generation, it is not costed. This leaves the labor input as the major cost element in the production system. It is estimated that the production system uses about 180 mandays with an estimated cost of about $139/ha. On old land where land clearing is not necessary, less labor is required, reducing this assumption to 170 mandays at a cost of around $131/ha. Since the production system depicted here uses limited or no purchased inputs, the major material inputs are seeds, gunny bags and transport services which altogether cost about $75/ha. Thus the total variable cost comes to $214/ha, which leads to a negative gross margin of $33/ha or $0.19/day. The relatively high level of labor use, low yields, and subsequent low or negative returns to labor imply that bean farmers in Uganda may be merely producing at subsistence level with less emphasis on the opportunity cost of their family labor used in producing the beans.

The nonvariable cost element is estimated at $17.86 (Bank of Uganda, 1993) which results in a total cost estimate of $232/ha or $0.29/kg. The bean as a farm enterprise is estimated therefore to yield a negative profit of about $66/ha, or $0.06/kg. Sensitivity analysis using different cost and yield assumptions was undertaken to determine the impact on total per kilogram costs. In particular, fixed costs were reduced since the secondary data had what seemed to be unreasonably high fixed cost assumptions (U1 in Table A4.1). This resulted in a slightly lower per kilo cost ($0.26/kg instead of $0.29/kg), but did not affect the overall ranking of countries in the comparative analysis.

COST OF BEAN PRODUCTION IN TANZANIA

Beans are widely grown and consumed in Tanzania. However, the major bean producing areas in the country include Kagera, Iringa, Kigoma, Rukwa, Mbeya, Arusha and Kilimanjaro (Bina Mungu, 1993). Like in Kenya and Uganda, beans are mainly produced by smallholders for home consumption, although due to cash demands most of the beans now find their way to the national market and cross border trade for sale. Although reliable statistics are hard to come by, the current national production is estimated at about 508,000 tons. The area under the crop is estimated to be between 550,000 and 600,000 hectares giving an average national yield of about 800 to 900 kg/ha. Under good crop husbandry practices, farmers

in areas like Kagera, Arusha and Kilimanjaro are capable of obtaining yields of about 1 to 1.5 tons pe r hectare.

The analysis presented in this section has taken yields obt ainable under good husbandry in Kagera (low input assumptions and 1000 kg/ha) and in the Kilimanjaro/Arusha area (high input assumptions and 1250 kg/ha). In the case of Kagera area , the yield of 1000 kg/ha is expected to generate a total revenue of about $120/ha. This production system is labor intensive, using about 87 mandays per hectare. The system i s characterized by low input technology, using little or no purchased inputs except for seeds, gunny bags and transportation services. The total material and ot her intermediate input costs are estimated at about $50/ha. There is little or low no nonvariable (fixed) costs, so total costs are around $90/ha or $0.09/kg. The profit from this type of production system is estimated at about $29/ha or $0.03/kg (see Tables A4.1 and A4.4).

Under the high input ass umptions for the Arusha/Kilimajaro area, a yield level of 1250 kg/ha is taken as reasonable, giving a t otal revenue of about $164/ha. This production system is less labor intensive than the Kagera case, and is estimated to use only 39 mandays per hectare at a cost of about $21.   The use of intermediate and other material inputs is modest at $67/ha. Total variable costs are $89/ha. The nonvariable costs, mainly represented by depreciation, are estimated at $4. Total costs are therefore around $93/ha, or $0.07/kg. Profits are estimated at $71/ha or $0.06/kg under such a production system.

Appendix 5

Textiles Cost of Production

Table A5.1: Uganda: Costs of Production for 200g/m Cotton Fabric, 1994

COST COMPONENT	UNIT VALUE	
	(Uganda Shs.)	US$
RAW MATERIALS		
Cotton	442.5	0.433
Dyes & Chemicals	191.8	0.188
Subtotal	634.3	0.621
DIRECT LABOR	149.9	0.147
OVERHEAD COSTS		
Administration	361.6	0.35
Marketing	90.8	0.09
Factory	243.9	0.239
Subtotal	696.3	0.679
UTILITIES		
Furnace Oil	123.1	0.120
Electricity and Water	185.6	0.182
Subtotal	431.1	0.302
Depreciation	271.7	0.266
Total	2183.3	2.017

Table A5.2: Tanzania Costs of Production for 200g/m Cotton Fabric, 1993

COST COMPONENT	UNIT VALUE (200 G/M)	
	Tanzania Shs.	US$
RAW MATERIALS		
Cotton	239.7	0.533
Dyes and Chemicals	208.3	0.46
Subtotal	448.0	0.996
DIRECT LABOR		
Wages, overtime and leave	87.2	0.194
House allowance	5.85	0.013
Transport allowance	7.02	0.016
Pension Fund Contribution	5.96	0.013
House Levy	3.55	0.008
Medical Expenses	3.66	0.008
Uniforms	1.89	0.004
Soap allowance	1.08	0.002
Subtotal	116.2	0.258
OVERHEAD COSTS		
Salaries and monetary allowances	73.9	0.164
Board meeting expenses	1.86	0.004
Texco Management expenses	7.45	0.017
Repairs and Maintenance	45.4	0.100
Motor vehicles running expenses	2.36	0.005
Stationery and Printing	1.10	0.002
Subtotal	132.1	0.294
OTHER OVERHEADS		
Depreciation		
Machinery	13.5	0.029

Table A5.2: Tanzania Costs of Production for 200g/m Cotton Fabric, 1995 (Continued)

COST COMPONENT	UNIT VALUE (200 G/M)	
	Tanzania Shs.	US$
Industrial Building	3.6	0.008
Furniture	2.1	0.005
Subtotal	19.16	0.043
Insurance	2.45	0.005
Legal Expenses	0.64	0.001
Accounting Expenses	95.9	0.213
Travel Expenses	9.2	0.02
Other Utilities	66.2	0.147
Subtotal	212.7	0.388
UTILITIES		
Fuel	119.8	0.266
Water	25.7	0.057
Electricity	78.1	0.173
Telecommunications	20.8	0.046
Subtotal	244.4	0.543
TOTAL	1858.8	2.52

Table A5.3: Kenya Costs of Production for 200g Cotton Fabric, 1993

COSTS	VALUE (Kshs)	UNIT COST (200g/m2) US$	UNIT COST (200g/m2)(kshs)
RAW MATERIALS			
Cotton	70,111,410	0.74	48.1
Dyes and Chemicals	15,315,025	0.17	10.5
Subtotal	85,426,435	0.866	58.6
Direct & Indirect Labor	51,033,950	0.514	35.01
Utilities (Electricity, Water and Fuel)	17,448,410	0.18	11.66
Spares	5,040,475	0.02	3.45
Depreciation	10,005,000	0.110	6.86
TOTAL	248,438,000	1.74	115.58

Table A5.4: UGANDA: Total Value of Textile Exports (US$ `000)

COMMODITY	1988	1989	1990	1991	1992
Clothing	255	16	88	82	91
Textile Yarn/Fabrics	9	13	55	52	8

Source: Background to the Budget 1994/5, MOF Kampala, Uganda

Table A5.5: Kenya: Total Value of Textile Exports (Million US$)

PRODUCT	COUNTRY/REGION	1991	1992	1993	1994 (Jan.-Jul.)
Garments	USA	1.37	2.16	7.41	5.42
	EEC	0.03	0.10	1.76	0.81
	PTA	0.10	0.26	0.17	0.74
	Others	0	0	0.4	0.06
	Subtotal	1.5	2.52	9.74	7.03
Other Textiles	USA	0	0	1.31	2.11
	EEC	0.02	0.08	0.33	0.04
	PTA	0.43	1.19	0.17	2.95
	Others	80	0.02	0.01	0
	Subtotal	0.45	1.288	1.82	5.10
	TOTAL	1.15	3.81	11.6	12.13

Exchange Rate Assumptions: 1991, 1 US$ = 28Kshs; 1992, 1 US$ = 33Kshs; 1993, 1 US$ = 59Kshs; 1994, 1 US$ = 58Kshs.

Source: Ministry of Commerce

Appendix 6

Domestic Resource Cost

Appendix 6 gives the summary tables of the DRC ca lculations for maize and beans by country and by both regional (East African Nairobi, Kampala and Dares Salaam) and World Markets. Table 6.0 shows th e range of producer prices prevailing in each country, and the expor t prices each country faces in the regional (East African) and the World market for the period covered.

The capital cities of each of the three countries were taken as the regional markets for ease of analysis and for demonstrativ e purposes. However, the analysis could be extended to cover other towns and urban centers in each of the countries. In Kenya for example, both domestic maize and beans from production surplus areas would go into the Nairobi m arket and fetch a price of $0.18 (for maize) or $0.47 (for beans). Maize and beans from Uganda or Tanzania going into Nairobi would face the same prices for the tw o commodities.

In Uganda, the export price for maize and beans is based on the World Food Programme base price which is 510 percent above the local Kampala price provided such prices are below the CIF world prices landed at Kampala. By extension therefore, any maize and beans from Kenya and Tanzania going int o Kampala face those export prices.

In Tanzania, there are two "in country" export prices facing maize and beans supplies from surplu s regions. The Dares Salaam prices and the border prices in the Southern regions where such produce i s exported to Zambia, Malawi, Rwanda and Burundi. For example, in such southern borders, maize price was given as US $0.20 while the bean pr ice was US $0.50. These prices are given in brackets in Table 6.0 under World Export Prices. For the purp oses of this report, these southern border prices are assumed to be only for Tanzania domestic produ ce and thus Kenyan and Ugandan exports are assumed to face the Dares Salaam prices and hence our analysis and DRC calculations are limited to these prices.

Finally, in the world market all the three cou ntries are assumed to face the same world price estimated at US $0.12 for maize and US $0.41 for beans. (See Table A6.0)

Table A6.0: Prices Used in DRC Calculations vs. Producer Prices for Maize and Beans

COUNTRY	PRODUCER PRICE (Domestic)	EAST AFRICAN EXPORT PRICE			WORLD EXPORT PRICE
		Nairobi	Kampala	Dar	
MAIZE PRICES					
Kenya	0.12	0.18	0.18	0.12	0.15	0.12
Uganda	0.09	0.14	0.18	0.12	0.15	0.12
Tanzania	0.07	0.12	0.18	0.12	0.15	0.12 (0.20)
BEAN PRICES					
Kenya	0.37	0.47	0.47	0.25	0.38	0.41
Uganda	0.14	0.23	0.47	0.25	0.38	0.41
Tanzania	0.13	0.18	0.47	0.25	0.38	0.41 (0.50)

Sources:

For Maize: *Author's Compilation from Field Information; Table A3.1 A3.5 and Tables in Appendix 6 Bank of Uganda Agricultural Secretarial Report (1993); Tanzania Agricultural Sector Memorandum by Dr. Shetty et al (1992); Mdadila (1992/93) and Sekabembe (1994)*

For Beans: *Author's Compilation from Field Information; Tables in Appendix 3 and Appendix 6*

Table A6.1a: Analysis of Comparative Advantage and Competitiveness of Kenyan Smallholder Maize in Regional (E. Africa) and World Market (Ksh/Kg)

	REGIONAL EAST AFRICAN MARKET								
	NAIROBI			KAMPALA			DAR ES SALAAM		
	Financial	Foreign	Local	Financial	Foreign	Local	Financial	Foreign	Local
OUTPUT									
Export Price US$/Kg	0.18	0.18		0.12	0.12		0.15	0.15	
Exchange Rate Ksh/US$	59	59		59	59		59	59	
Value of Output Ksh/Kg	10.62	10.62		7.08	7.08		8.85	8.85	
ON-FARM COSTS									
Labor	0.70	0	0.70	0.70	0	0.70	0.70	0	0.70
Material Int/ Inputs	3.90	0.45	3.45	3.90	0.45	3.45	3.90	0.45	3.45
Fixed Costs	0.02	0	0.02	0.02	0	0.02	0.02	0	0.02
OFF-FARM COSTS									
Processing Costs	0	0		0	0	0	0	0	0
Marketing Costs	1.11	0.74	0.37	1.65	0.99	0.66	2.86	1.72	1.14
TOTAL COSTS	5.73	1.19	4.54	6.27	1.44	4.83	7.46	2.17	5.31
Net Output Value	4.89			0.81			1.39		
DRC Ratio	0.48			0.53			0.62		
DRC	28.32			31.27			36.58		

Table A6.1b: Analysis of Comparative Advantage and Competitiveness of Kenyan Large Scale Maize in Regional (E. Africa) and World Market (Ksh/Kg)

	REGIONAL EAST AFRICAN MARKET								
	NAIROBI			KAMPALA			DAR ES SALAAM		
	Financial	Foreign	Local	Financial	Foreign	Local	Financial	Foreign	Local
OUTPUT									
Export Price US$/Kg	0.18	0.18		0.12	0.12		0.15	0.15	
Exchange Rate Ksh/US$	59	59		59	59		59	59	
Value of Output Ksh/Kg	10.62	10.62		7.08	7.08		8.85	8.85	
ON-FARM COSTS									
Labor	0.35		0.35	0.35	0	0.35	0.35	0	0.35
Material/Int. Inputs	5.64	3.76	1.88	5.64	3.76	1.88	5.64	3.76	1.88
Fixed Costs	0.78	0.46	0.32	0.78	0.46	0.32	0.78	0.46	0.32
OFF-FARM COSTS									
Processing Costs	0	0	0	0	0	0	0	0	0
Marketing Costs	1.11	0.74	0.37	1.65	0.99	0.66	2.86	1.72	1.14
TOTAL COSTS	7.88	4.96	2.92	8.42	5.21	3.21	9.63	5.94	3.69
Net Output Value	2.74			1.34			0.78		
DRC Ratio	0.52			1.72			1.27		
DRC	30.68			101.28			74.81		

Source: Authors' Own Compilation from Tables in Appendix 3, Odhiambo et al (1994) and Nyoro (1993), Bank of Uganda Agric. Secretariat Report (1993) and Shetty et al (1992).

Table A6.2: Analysis of Comparative Advantage and Competitiveness of Beans from Kenya
in Regional (E. Africa) and World Market (Ksh/Kg)

	REGIONAL EAST AFRICAN MARKET								
	NAIROBI			KAMPALA			DAR ES SALAAM		
	Financial	Foreign	Local	Financial	Foreign	Local	Financial	Foreign	Local
OUTPUT									
Export Price US$/Kg	0.47	0.47		0.25	0.25		0.38	0.38	
Exchange Rate Ksh/US$	59	59		59	59		59	59	
Value of Output Ksh/Kg	27.73	27.73		14.75	14.75		22.42	22.42	
ON-FARM COSTS									
Labor	1.93		1.93	1.93		1.93	1.93		1.93
Material/Int. Inputs	8.53	5.69	2.84	8.53	5.69	2.84	8.33	5.69	2.84
Fixed Costs	0.05	0.02	0.03	0.05	0.02	0.03	0.05	0.02	0.03
OFF-FARM COSTS									
Processing Costs	0	0	0	0	0	0	0	0	0
Marketing Costs	1.11	0.74	2.92	1.65	0.99	0.66	2.86	1.72	1.14
TOTAL COSTS	11.62	6.45	7.72	11.96	6.70	5.46	13.17	7.43	5.94
Net Output Value	16.11	21.28		2.79	8.05		9.25		
DRC Ratio	0.36			0.68			0.39		
DRC	95.69			40.00			23.38		

Source: Compiled from tables in Appendix 4 and Oudergo (1994) and Bank of Uganda Agricultural Secretariat Report (1993) and Shetty et al (1992).

Table A6.3: Financial Analysis of Comparative Advantage and Competitiveness of Ugandan
Maize in Regional (E. Africa) and World Market (Ksh/Kg)

	REGIONAL EAST AFRICAN MARKET								
	NAIROBI			KAMPALA			DAR ES SALAAM		
	Financial	Foreign	Local	Financial	Foreign	Local	Financial	Foreign	Local
OUTPUT									
Export Price US$/Kg	0.18	0.18		0.12	0.12		0.15	0.15	
Exchange Rate Ksh/US$	1036	1036		1036	1036		1036	1036	
Value of Output Ksh/Kg	186.48	186.48		124.32	124.32		155.40	155.40	
ON-FARM COSTS									
Labor	73.20		73.20	73.20		73.20	73.20		
Material/Int. Inputs	78.15	29.55	48.60	78.15	29.55	48.60	78.15	29.55	
Fixed Costs	0.50	0.24	0.26	0.50	0.24	0.26	0.50	0.24	26
OFF-FARM COSTS									
Processing Costs									
Marketing Costs	16.34	9.08		15.00	9.78	5.22	77.00	50.00	
TOTAL COSTS	168.19	38.87		166.85	39.57	127.80	288.85	79.79	9
Net Output Value	18.29	147.61		42.53	84.75		133.45	75.61	
DRC Ratio	0.88			1.51			1.97		
DRC		907.63		156.25			2042.40		

*Source: Authors' Own Compilation from Tables in Appendix 3, Odhiambo et al (1994), Bank of Uganda (1993)
and Sekabembe (1994).*

Table A6.4: Analysis of Comparative Advantage and Competitiveness of Ugandan Beans in Regional (E. Africa) and World Market (Ush/Kg)

	REGIONAL EAST AFRICAN MARKET								
	NAIROBI			KAMPALA			DAR ES SALAAM		
	Financial	Foreign	Local	Financial	Foreign	Local	Financial	Foreign	Local
OUTPUT									
Export Price US$/Kg	0.47	0.47		0.25	0.25		0.38	0.38	
Exchange Rate Ksh/US$	1036	1036		1036	1036		1036	1036	
Value of Output Ksh/Kg	486.92	486.92			259		393.68	393.68	
ON-FARM COSTS									
Labor	180.01		180.01	180.01		180.01	180.01		80.0
Material/Int. Inputs	97.27	7.44	89.83	97.27	7.44	89.83	97.27	7.44	9.8
Fixed Costs	23.23	10.90	12.23	23.23	10.90	12.23	23.23	10.90	2.2
OFF-FARM COSTS									
Processing Costs	56.77	20.43	16.34	36.77	20.43	16.34	36.77	20.34	6.4
Marketing Costs	38.50	25.10	13.40	15.00	9.78	5.22	50.00	23.00	7.0
TOTAL COSTS	375.68	63.87	311.81	352.16	48.55	303.63	414.18	88.68	25.5
Net Output Value	111.24	43.05		93.16			205.00		
DRC Ratio	4.88			1.44			1.07		
DRC	5057.70			1494.71			1105.63		

Source: *Authors' own compilation from Tables in Appendix 4, Bank of Uganda (1993), Sekabembe (1994) , and Shetty et al (1992).*

Table A6.5: Analysis of Comparative Advantage and Competitiveness of Tanzanian Maize in Regional (E. Africa) and World Market (Ksh/Kg)

| | REGIONAL EAST AFRICAN MARKET | | | | | | | | |
| | NAIROBI | | | KAMPALA | | | DAR ES SALAAM | | |
	Financial	Foreign	Local	Financial	Foreign	Local	Financial	Foreign	Local
OUTPUT									
Export Price US$/Kg	0.18	0.18		0.12	0.12		0.15	0.15	
Exchange Rate Ksh/US$	450	450		450	450		450	450	
Value of Output Ksh/Kg	81.00	81.00		54.00	54.00		67.50	67.50	
ON-FARM COSTS									
Labor	7.74		7.74	7.74		7.74	7.74		7.74
Material/Int. Inputs	13.11	6.45	6.66	13.11	6.45	6.66	13.11	6.45	6.66
Fixed Costs	0.70	0.42	0.28	0.70	0.42	0.28	0.70	0.42	0.28
OFF-FARM COSTS									
Processing Costs									
Marketing Costs	34.16	23.91	10.25	34.16	23.91	10.25	34.16	23.91	10.25
TOTAL COSTS	51.71	30.78	24.88	55.71	30.78	24.94	55.71	30.78	24.94
Net Output Value	25.29	50.22		1.71	23.22		11.79	36.72	
DRC Ratio	0.10			1.07				0.68	
DRC	222.94			481.50				305.64	

Source: Compiled from tables in Appendix 3 and Shetty et al (1992).

Table A6.6: Analysis of Comparative Advantage and Competitiveness of Tanzanian Beans in
Regional (E. Africa) and World Market (Tsh/Kg)

	REGIONAL EAST AFRICAN MARKET								
	NAIROBI			KAMPALA			DAR ES SALAAM		
	Financial	Foreign	Local	Financial	Foreign	Local	Financial	Foreign	Local
OUTPUT									
Export Price US$/Kg	0.47	0.47		0.25	0.25		0.38	0.38	
Exchange Rate Ksh/US$	450	450		450	450		450	450	
Value of Output Tsh/Kg	211.50	211.50		112.50	112.50		171.00	171.00	
ON-FARM COSTS									
Labor	7.72			7.72			7.72		
Material/Int. Inputs	24.22	11.92	12.30	24.22	11.92	12.30	24.22	11.92	12.30
Fixed Costs	1.40	0.84	0.56	1.40	0.84	0.56	1.40	0.84	0.56
OFF-FARM COSTS									
Processing Costs									
Marketing Costs	34.16	23.91	10.25	34.16	23.91	10.25	34.16	23.91	10.25
TOTAL COSTS	67.50	36.67	23.11	67.50	36.67	23.11	67.50	36.67	23.11
Net Output Value	144.00	174.83		45.00	75.83		103.50	134.33	
DRC Ratio	0.13			0.30			0.17		
DRC	59.48			135.00			77.40		

Source: Compiled from tables in Appendix 4 and Shetty et al (1993).

Appendix 7

Textile Industry

UGANDA

One of the first and largest ventures in Uganda wa s in the textile industry in the 1950's, the Nyanza Textile Mill (NYTIL) undertaken with Calico Printers Ltd. of the UK. The industry grew and prospered in th e 1960's as other groups like the Madhvani group set up factories to exploit increasing market potential in the region. By the early 1970's the industry consisted of seven manufacturing plants and numerous cotton ginneries. Most of the plants are vertically integrated processing raw lint through both spinning an d weaving into the finished product, printed cotton fabrics.

The structure of the industry has remained the same up to the present, however the destructiv e management practices and the expulsion of Asians during the 1970's has had a debilitating effect o n industry output and production to this day.

The majority of the mills in Uganda are owned either whol ly or substantially by the government, either directly or via parastatal bodies, mainly the Ugandan Development Corporation. Since the early 1980' s successive governments have sought to revive the industrial sector in general and the textile industr y specifically. The mills have been returned to their former owners and rehabilitation projects implemented in several mills to varying degrees of success. Cu rrently, the government is actively seeking to divest itself completely from the industry and is in the process of finalizing sales of several mills to private investors. As a result, the industry is in a state of flux and capacity utiliza tion very low. In 1993, only 15 to 25 percent of the total milling capacity was being utilized.

Between 1990 and 1993, production in textiles only averaged 80 percent of 1987 levels. Garmen t production has improved considerably however, averaging 481 percent above 1987 levels between 1990 and 1993 (Table 7.1).

Table 7.1: Quantum Index of Industrial Production in the Textile Industry in Uganda (1987= 100)

COMMODITY	1990	1991	1992	1993
Textiles	79.8	88.2	88.7	67.1
Textile Products	116.5	48.7	52.9	77.1
Garments	477.8	556	494.7	398.1

Source: Background to the Budget, 1994-95, Ministry of Finance and Economic Planning, Kampala Uganda

As a result of the problems facing the industry, particularly efforts at rehabilitation, the government has been forced to allow imports to make up for the shortfall in domestic supply. The result has been the importation of substantial amounts of cheap second hand clothing and cheap 100 percent synthetic fiber fabrics. These clothes often enter the market duty free and have adversely affected the ability of the local textile and tailoring industry to compete in local markets.

An added factor affecting the industry has been the supply of cotton, which has been affected by poor returns, a top heavy and inefficient marketing structure, poor quality ginning and lower yielding cotton varieties compared to other countries. The government is committed to revitalizing cotton growing and has instituted a number of reforms which will go a long way to improving production in the medium to long term.

KENYA

The textile industry in Kenya is the third largest employer after agriculture and the civil service employing 1820 percent of all employees in the manufacturing sector. There are currently 52 integrated mills distributed all over the country and 400500 garment units. A good number of these are Manufacturing Under Bond (MUB) or are in the Export Processing Zones (EPZ), manufacturing all their products for export.

The textile industry was among the earliest industries to be set up in Kenya. By independence in 1963, there were four integrated mills and three other mills, all privately owned. During the 1960's and 70's, the government gradually increased its share in the industry as new mills were set up in partnership with foreign investors. In the early 1980's the government assumed full ownership of a number of these mills as foreign investors pulled out. These mills were protected under the government's policy of import substitution until the mid-1980's when the government began to liberalize the industry and gradually open it up to market forces. In line with this policy, the government is divesting itself from those mills currently under its ownership and encouraging both local and foreign investment in these mills.

Installed production capacity of Kenyan textile mills is approximately 125 million meters per annum. The private sector accounts for 64 percent of this capacity, the rest is government owned. Estimates available in March 1994, indicate that actual production levels are at approximately 83 million meters, implying an average capacity utilization of 66 percent. Capacity utilization varies however, and is generally much higher in the private sector mills (7080 percent). A good number of government mills are ailing and are performing at about 48 percent of their rated capacity of 45 million meters per annum. The capacity utilization in the garment industry is 71 percent and in the MUB/EPZ firms it is close to 100 percent.

Overall performance of the industry has been mixed since 1990. After recording a growth rate of 12.5 percent in 1990, it declined and then stagnated in 1991 and 1992. The upsurge in 1993 to 15.3 percent can be attributed to increased exports and more involvement of the private sector in the industry (see Table 7.2)

Table 7.2: Quantum Index of Production for Textile Manufacturing, Kenya

	1990	**1991**	**1992**	**1993**
Index	221.9	213.0	213.0	245.6
Growth Rate	12.5%	4%	0%	15.3%

Source: Economic Survey 1994

The export performance of the sector has been a bright star in an otherwise difficult period for th e textile industry and manufacturing in general in Kenya. Growth in the sector has been quite remarkable in the past four years growing in value terms from Kshs. 54 millio n in 1991 to Kshs. 703 million over the first seven months of 1994. This growth is largely due to the influx of MUB and EPZ firms and is expected to continue to grow as Kenyan firms establish themselves through more aggressive and sophisticate d marketing and markets expand in the European Union and Comesa markets.

Performance of the textile industry can therefore be characterized as increasingly robust in the private sector as Kenya takes advantage of export opportunities and increasing investment in the industry by the private sector both local and foreign. Performance in the formerly public s ector dominated industries should also improve as private investors inject capital, new technologies and management into these enterprises.

TANZANIA[33]

The textile sector is extremely important to the Tanzanian economy both in terms of contribution t o employment, and as a potential source for foreign exchange revenue. In recent years, however, the sector has experienced a myriad of problems including low capacity utilization, high operating costs, inadequate capital/finance, huge debts and an antiexport bias. The sector is currently the largest within th e manufacturing sector in Tanzania in terms of size and employment . It accounts for 20 percent of al l establishments in the manufacturing sector and 38 percent of total manufacturing employment.

The industry has well developed forward and backward linkages; it receives raw materials from the cotton grown in the agricultural sector which is a source of income for more than 6 million people in the lake zone. It also supplies canvas material to the shoe industry. Capacity in Tanzania is one of the largest in Africa with a rated capacity of about 50, 000 tons of yarn and 200 million square meters of woven cloth.

Most of the textile industries in Tanz ania are state owned, accounting for about 80 percent of installed capacity in the industry. However, the private sector has tended to be more efficient than the state owned mills in terms of both capacity utilization and export performance. In ter ms of production, the private sector achieved an average capacity utilization of 50 percent between 1988 and 1992, while that of the publi c sector was below 20 percent. The private sector also accounted for 5060 percent of total textile expor t earnings.

Thus despite the huge installed capacity in public firms, their performance has been disappointing even after the inception of the government's structural adjustment programme (SAP) in 1986. In fact , performance may have been exace rbated by some of the macroeconomic policies pursued under the SAP. Using 1980 as an index, between 1987 and 1992, production averaged only 57.4 percent of 1980 level s (Table 7.3). Exchange rate adjustments have added huge external debt in local currency terms to bot h private and public firms and trade liberalization has also resulted in a flood of cheap imports which have stifled production opportunities for local industry. This, coupled with inef ficient management, lack of skills, a poor infrastructure, and poor business environment, ha ve hampered the local textile industry in Tanzania.

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[33] Much of this section is taken from a paper entitled "Measures to enhance forex generation in the Textile Industry". TEXCO, 1993.

Table 7.3: Quantum Index of Production in the Textile Industry in Tanzania

	1987	1988	1989	1990	1991	1992
Production ('000 Sq. Meters)	39,064	38,916	41,169	58,381	85,220	30,218
Index (1980=100)	43.3	43.2	45.7	84.4	94.5	33.5

Source: Bank of Tanzania, Annual Report, 1992

Despite the problems faced by the industry, the potential for expansion is there if considerable an d concerted policy measures are put in place to revive the industry.

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